Vol. 1109 Number 4

OFFICIAL GAZETTE

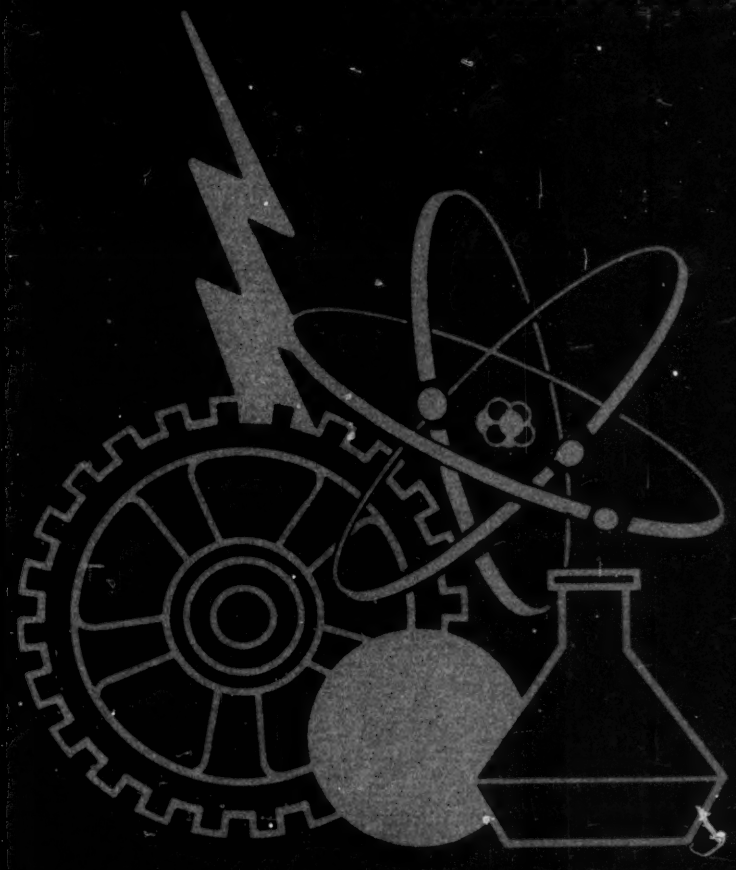
of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

DECEMBER 26, 1989



PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

December 26, 1989 Volume 1109 Number 4

CONTENTS

	Page
Patent and Trademark Office Notices	
Patent Cooperation Treaty (PCT) Information	1109 OG 40
Notice of Maintenance Fees Payable	1109 OG 40
Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees	1109 OG 41
Reissue Applications Filed	1109 OG 42
Requests for Reexaminations Filed	1109 OG 43
Notice of Recordation	1109 OG 43
Service by Publication	1109 OG 43
Status of PTO Services	1109 OG 44
Patent Certificates of Correction	1109 OG 45
Special Boxes for Mail	1109 OG 46
Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries	1109 OG 47
Condition of Patent Applications	1109 OG 49
Reexaminations	1585
Reissue Patents Granted (33,134)	1587
Plant Patents Granted (7,082)	1589
Patents Granted	
General and Mechanical (4,888,825)	1591
Chemical (4,889,535)	1833
Electrical (4,889,958)	1959
Design Patents Granted (305,175)	2089
Index of Patentees	PI 1
Indices of Reissue, Reexamination, Design, and Plant Patentees	PI 59
Classification of	
Patents (Including Reissues and Reexaminations)	PI 63
Designs, and Plants Applications	PI 66
Geographical Index of Residence of Inventors	
Patents (Including Reissues and Reexaminations)	PI 67
Designs and Plant Applications	PI 68
Change of Address Form and Subscription Order Form	Back Page

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.
THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $10.00 each; copies of TRADEMARKS at $1.50 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 5 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of Jan. 1, 1990, and was announced in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	
—If paid before Jan. 1, 1990	1040.00
—If paid on or after Jan. 1, 1990	1140.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA.	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	436.00
Basic Supplemental fee (for each page over 30)	9.00
Designation fee per country or region for the first 10 national or regional offices	106.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	134.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Nov. 7, 1989.

JEFFREY M. SAMUELS
Acting Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on December 23, 1986, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,630,317 through 4,631,751
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on December 21, 1982 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,364,123 through 4,365,350
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force

beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED OCTOBER 8, 1989
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,545,093	06/614,132	10/08/85
4,545,099	06/630,353	10/08/85
4,545,101	06/575,794	10/08/85
4,545,104	06/380,439	10/08/85
4,545,105	06/529,747	10/08/85
4,545,108	06/558,899	10/08/85
4,545,112	06/523,654	10/08/85
4,545,119	06/457,684	10/08/85
4,545,126	06/569,626	10/08/85
4,545,143	06/545,046	10/08/85
4,545,144	06/399,070	10/08/85
4,545,148	06/507,162	10/08/85
4,545,152	06/473,589	10/08/85
4,545,153	06/560,417	10/08/85
4,545,158	06/504,364	10/08/85
4,545,159	06/504,326	10/08/85
4,545,161	06/591,679	10/08/85
4,545,162	06/491,902	10/08/85
4,545,166	06/553,465	10/08/85
4,545,167	06/545,837	10/08/85
4,545,169	06/504,362	10/08/85
4,545,171	06/491,815	10/08/85
4,545,173	06/467,020	10/08/85
4,545,183	06/662,706	10/08/85
4,545,186	06/515,764	10/08/85
4,545,188	06/477,872	10/08/85
4,545,189	06/694,147	10/08/85
4,545,196	06/400,579	10/08/85
4,545,201	06/404,508	10/08/85
4,545,202	06/545,043	10/08/85
4,545,203	06/517,917	10/08/85
4,545,207	06/271,860	10/08/85
4,545,208	06/589,113	10/08/85
4,545,216	06/567,946	10/08/85
4,545,218	06/651,385	10/08/85
4,545,225	06/524,562	10/08/85
4,545,226	06/566,523	10/08/85
4,545,231	06/635,655	10/08/85
4,545,232	06/672,522	10/08/85
4,545,234	06/571,371	10/08/85
4,545,246	06/532,033	10/08/85
4,545,254	06/616,345	10/08/85
4,545,263	06/480,495	10/08/85
4,545,265	06/543,839	10/08/85
4,545,267	06/586,304	10/08/85
4,545,269	06/489,459	10/08/85
4,545,281	06/568,225	10/08/85
4,545,282	06/551,114	10/08/85
4,545,286	06/620,509	10/08/85
4,545,289	06/530,976	10/08/85
4,545,294	06/554,078	10/08/85
4,545,296	06/622,116	10/08/85
4,545,309	06/595,654	10/08/85
4,545,312	06/638,243	10/08/85
4,545,313	06/579,948	10/08/85
4,545,317	06/445,498	10/08/85
4,545,345	06/555,406	10/08/85
4,545,346	06/477,533	10/08/85
4,545,351	06/534,632	10/08/85
4,545,360	06/553,785	10/08/85
4,545,361	06/596,259	10/08/85
4,545,370	06/532,221	10/08/85
4,545,386	06/487,784	10/08/85
4,545,394	06/537,573	10/08/85
4,545,395	06/552,421	10/08/85
4,545,409	06/600,122	10/08/85
4,545,419	06/224,472	10/08/85
4,545,420	06/589,676	10/08/85
4,545,436	06/572,558	10/08/85
4,545,440	06/482,944	10/08/85
4,545,461	06/569,291	10/08/85
4,545,470	06/560,906	10/08/85
4,545,471	06/514,617	10/08/85
4,545,473	06/349,267	10/08/85
4,545,479	06/640,258	10/08/85
4,545,491	06/503,150	10/08/85
4,545,501	06/667,427	10/08/85
4,545,505	06/397,995	10/08/85
4,545,507	06/422,413	10/08/85
4,545,510	06/424,655	10/08/85
4,545,511	06/436,673	10/08/85
4,545,521	06/618,880	10/08/85
4,545,522	06/624,378	10/08/85
4,545,523	06/600,615	10/08/85
4,545,525	06/584,647	10/08/85
4,545,532	06/381,948	10/08/85
4,545,538	06/566,525	10/08/85
4,545,568	06/581,364	10/08/85

Patent Number	Serial Number	Issue Date
4,545,577	06/557,609	10/08/85
4,545,578	06/544,751	10/08/85
4,545,581	06/546,283	10/08/85
4,545,582	06/459,455	10/08/85
4,545,590	06/465,662	10/08/85
4,545,591	06/585,381	10/08/85
4,545,592	06/547,979	10/08/85
4,545,594	06/514,019	10/08/85
4,545,595	06/609,428	10/08/85
4,545,598	06/315,671	10/08/85
4,545,599	06/486,344	10/08/85
4,545,603	06/569,036	10/08/85
4,545,608	06/530,299	10/08/85
4,545,621	06/532,500	10/08/85
4,545,622	06/541,517	10/08/85
4,545,624	06/466,872	10/08/85
4,545,642	06/352,326	10/08/85
4,545,660	06/609,278	10/08/85
4,545,662	06/502,019	10/08/85
4,545,675	06/581,531	10/08/85
4,545,678	06/510,264	10/08/85
4,545,681	06/465,337	10/08/85
4,545,682	06/522,012	10/08/85
4,545,688	06/563,807	10/08/85
4,545,696	06/518,218	10/08/85
4,545,709	06/477,718	10/08/85
4,545,710	06/403,223	10/08/85
4,545,712	06/521,972	10/08/85
4,545,715	06/497,134	10/08/85
4,545,726	06/379,630	10/08/85
4,545,728	06/528,054	10/08/85
4,545,737	06/407,268	10/08/85
4,545,753	06/555,355	10/08/85
4,545,755	06/470,598	10/08/85
4,545,763	06/528,855	10/08/85
4,545,765	06/547,531	10/08/85
4,545,772	06/610,275	10/08/85
4,545,773	06/449,631	10/08/85
4,545,782	06/459,565	10/08/85
4,545,797	06/503,972	10/08/85
4,545,804	06/553,597	10/08/85
4,545,812	06/441,381	10/08/85
4,545,836	06/440,169	10/08/85
4,545,860	06/474,012	10/08/85
4,455,867	06/542,095	10/08/85
4,545,872	06/593,221	10/08/85
4,545,884	06/612,244	10/08/85
4,545,894	06/633,768	10/08/85
4,545,896	06/593,504	10/08/85
4,545,905	06/615,466	10/08/85
4,545,908	06/653,285	10/08/85
4,545,921	06/566,734	10/08/85
4,545,932	06/494,336	10/08/85
4,545,944	06/561,610	10/08/85
4,545,945	06/329,886	10/08/85
4,545,946	06/578,504	10/08/85
4,545,961	06/385,347	10/08/85
4,545,967	06/469,863	10/08/85
4,545,971	06/655,826	10/08/85
4,545,972	06/380,019	10/08/85
4,545,986	06/390,923	10/08/85
4,546,004	06/583,284	10/08/85
4,546,019	06/612,736	10/08/85
4,546,022	06/563,650	10/08/85
4,546,023	06/636,495	10/08/85
4,546,053	06/692,669	10/08/85
4,546,054	06/704,182	10/08/85
4,546,057	06/635,824	10/08/85
4,546,079	06/499,653	10/08/85
4,546,087	06/437,702	10/08/85
4,546,090	06/489,256	10/08/85
4,546,092	06/525,825	10/08/85
4,546,097	06/548,849	10/08/85
4,546,098	06/600,164	10/08/85
4,546,109	06/504,021	10/08/85
4,546,110	06/463,875	10/08/85
4,546,121	06/645,204	10/08/85
4,546,139	06/505,508	10/08/85
4,546,141	06/515,289	10/08/85
4,546,149	06/605,707	10/08/85
4,546,163	06/647,329	10/08/85
4,546,176	06/544,406	10/08/85
4,546,178	06/666,576	10/08/85
4,546,198	06/593,153	10/08/85
4,546,208	06/589,534	10/08/85
4,546,213	06/603,567	10/08/85
4,546,228	06/559,413	10/08/85
4,546,235	06/374,528	10/08/85
4,546,242	06/308,504	10/08/85
4,546,245	06/495,165	10/08/85
4,546,266	06/517,972	10/08/85
4,546,271	06/516,314	10/08/85
4,546,277	06/626,684	10/08/85
4,546,280	06/564,733	10/08/85
4,546,293	06/411,075	10/08/85
4,546,295	06/607,631	10/08/85
4,546,297	06/607,634	10/08/85
4,546,298	06/607,633	10/08/85
4,546,299	06/563,405	10/08/85
4,546,300	06/476,116	10/08/85
4,546,311	06/450,314	10/08/85
4,546,318	06/478,190	10/08/85
4,546,335	06/539,267	10/08/85
4,546,344	06/586,104	10/08/85
4,546,358	06/572,030	10/08/85
4,546,367	06/390,473	10/08/85
4,546,371	06/419,351	10/08/85
4,546,373	06/575,066	10/08/85
4,546,378	06/514,400	10/08/85
4,546,400	06/500,762	10/08/85
4,546,404	06/497,272	10/08/85
4,546,407	06/547,116	10/08/85
4,546,441	06/400,911	10/08/85
4,546,453	06/391,031	10/08/85
4,546,470	06/556,916	10/08/85
4,546,477	06/573,914	10/08/85
4,546,483	06/536,243	10/08/85

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1,21(b)).

4,653,478, Re. S. N. 346,482, Filed March 31, 1989, Cl. 128/6, ENDOSCOPE EQUIPMENT, Tatsho Nagasaki, et al., Owner of Record: *Olympus Optical, Tokyo, Japan*, Attorney or Agent: James E. Armstrong III, Ex. Gp.: 334

4,669,875, Re. S. N. 07/360,971, Filed June 2, 1989, Cl. 356/237, FOREIGN PARTICLE DETECTING METHOD AND APPARATUS, Masataka Shiba, Owner of Record: *Hitachi, Ltd., Tokyo, Japan*, Attorney or Agent: Melvin Kraus, Ex. Gp.: 156

4,679,929, Re. S. N. 380,299, Filed July 12, 1989, Cl. 355/4, MUTIPLEX IMAGE REPRODUCING APPARATUS, Satoshi Haneda, Owner of Record: *Inventor*, Attorney or Agent: Jordan B. Bierman, et al., Ex. Gp.: 215

4,688,675, Re. S. N. 398,774, Filed Aug. 25, 1989, Cl. 206/508, NESTING BOX WITH REDUCED LID FLARES, Daniel R. Miller, et al., Owner of Record: *Buckhorn Material Handling Group, Inc.*, Attorney or Agent: Thomas E. Beall, Jr., Ex. Gp.: 241

4,705,040, Re. S. N. 435,343, Filed Nov. 11, 1989, Cl. 128/334R, PERCUTANEOUS FIXATION OF HOLLOW ORGANS, Peter R. Mueller, et al., Owner of Record: *Boston Scientific Corp., Watertown, Mass.*, Attorney or Agent: Fish & Richardson, Ex. Gp.: 330

4,706,273, Re. S. N. 07/435,163, Filed Nov. 9, 1989, Cl. 379/58, CELLULAR TELEPHONE, A. Gil Spear, et al., Owner of

Record: *H.E.R. Manufacturing Inc., Pine Bluff, Ark.*, Attorney or Agent: Alex Rhodes, Ex. Gp.: 261

4,726,394, Re. S. N. 434,418, Filed Nov. 13, 1989, Cl. 137/341, HEATED COVER FOR PIPELINE BACK FLOW PREVENTER COMPONENT ASSEMBLY, Michael J. Devine, Owner of Record: *Commercial Insulation Co., Jacksonville, Fla.*, Attorney or Agent: Arthur G. Yeager, et al., Ex. Gp.: 347

4,740,749, Re. S. N. 07/330,415, Filed Mar. 29, 1989, Cl. 324/309, NMR IMAGING METHOD, Etsuji Yamamoto, Owner of Record: *Hitachi Ltd., Tokyo, Japan*, Attorney or Agent: Melvin Kraus, Ex. Gp.: 265

4,838,288, Re. S. N. 438,189, Filed Nov. 20, 1989, Cl. 134/110, HEART VALVE XENOGRAFT WASHING SYSTEM, Diana R. Wright, et al., Owner of Record: *Pioneering Technologies, Inc., Lakewood, Colo.*, Attorney or Agent: Grant L. Hubbard, Ex. Gp.: 242

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

Re. 31,998, Reexam. No. 90/001,888, Requested Nov. 14, 1989, Cl. 623/6, POSTERIOR CHAMBER LENS IMPLANT, William D. Myers, Owner of Record: *Inventor, Birmingham, Miss.*, Attorney or Agent: Gifford, Groh, Sprinkle, et al., Ex. Gp.: 330, Requester: Owner

3,921,346, Reexam. No. 90/001,887, Requested Nov. 13, 1989, Cl. 52/30, FIRE RETARDANT SHAFT WALL, Gale E. Sauer, Owner of Record: *National Gypsum Co., Buffalo, N. Y.*, Attorney or Agent: Marshall, O'Toole, Gernstein, et al., Ex. Gp.: 350, Requester: Georgia-Pacific Corp., Philadelphia, Pa.

4,637,865, Reexam. No. 90/001,891, Requested Nov. 7, 1989, Cl. 204/111, PROCESS FOR METAL RECOVERY AND COMPOSITIONS USEFUL THEREIN, Rodney Sergent, et al., Owner of Record: *Great Lakes Chemical Corp., West Lafayette, Ind.*, Attorney or Agent: Senniger, Powers, Leavitt & Roedel, Ex. Gp.: 110, Requester: Nixon & Vanderhye, Arlington, Va.

4,790,429, Reexam. No. 90/001,890, Requested Nov. 20, 1989, Cl. 206/219, PACKAGE, Tadao Fukushima, Owner of Record: *Dispen Pak, Japan Co., Inc., Tokyo, Japan*, Attorney or Agent: Dainow Rosen & Jacobs, Ex. Gp.: 240, Requester: Owner

4,866,110, Reexam. No. 90/001,889, Requested Nov. 9, 1989, Cl. 524/11, THERMOPLASTIC COMPOSITIONS, RESIN MOLDED PRODUCT FOR VEHICLE LINING AND METHOD FOR MANUFACTURING THE SAME, Chang Y. Lee, Owner of Record: *Han Il E'What Co., Ltd., Seoul, Rep. of Korea*, Attorney or Agent: Willian, Brinks, Olds, Hofer, et al., Ex. Gp.: 150, Requester: Berj A. Terzian, New York, N. Y.

DEPARTMENT OF THE TREASURY
UNITED STATES CUSTOMS SERVICE
(T.D. 89-94)

Recordation of Trade Name: "TRIPLE FAT GOOSE"
Agency: U. S. Customs Service, Department of the Treasury
Action: Notice of Recordation
Summary: On August 30, 1989, a notice of application for the recordation under section 42 of the Act of July 5, 1946, as amended (15 U. S. C. 1124), of the trade name "TRIPLE FAT GOOSE" was published in the Federal Register (54 FR 35983). The notice advised that before final action was taken on the application, consideration would be given to any relevant data, views, or arguments submitted in writing by any person in opposition to the recordation and received not later than October 30, 1989. No responses were recieved in opposition to the notice.

Accordingly, as provided in section 133.14, Customs Regulations (19 CFR 133.14), the name "TRIPLE FAT GOOSE" is recorded as the trade name used by Turbo Sportsware, Inc., a corporation organized under the laws of the State of New Jersey, located at One Walnut Street, Perth Amboy, New Jersey 08862. The trade name is used in connection with men's and boy's down-filled outwear and active sportswear manufactured in Korea.
Effective Date: November 8, 1989
For Furthur Information Contact: Bettie Coombs, Value, Special Programs and Admissibility Branch, 1310 Constitution Avenue, N. W., Washington, D. C. 20229 (202-566-5765).

November 2, 1989

MARVIN M. AMERNICK
Chief, Value, Special Programs and Admissibility Branch

Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of such proceeding sent by registered mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives, shall enter an apearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default,

National Celebrity Video, Inc., Minnetonka, Minn., Reg. No. 1,375,652, for the mark "NATIONAL CELEBRITY VIDEO", Canc. No. 18,099

ERMA S. BROWN
Administrator, Trademark Trial and Appeal Board
For JEFFREY M. SAMUELS
Assistant Commissioner for Trademarks

Status of PTO Services

The following is an update of the status of PTO services for November 1989:

Service Item	FY 1990 Goal (Calendar Days [1])	Monthly Average (Calendar Days [1])
Filing Receipts:		
Patents	22	15
Trademarks	30	18
Patent/Trademark Copies:		
Special Window Coupons	24 Hours	16 Hours
Window Coupons	5	3
Mail Coupons	12	5
Letter Orders	16	17
Electronic Ordering Services (EOS)	11	3
Certified Copies:		
Trademark Registrations	21	35
Applications-As-Filed	17	17*
File-Wrapper/Contents	N/A	15
Walk-up Certification	1	1
Patent Application Expedited	5	3*
Trademark Search Library:		
Filing Pending Marks	21	27**
Filing Reg. Certificates	Issue Date+2 Days	+1 Day
Filing Temp. Drawings	6	11**
Assignments:		
Recording Patent-New Applications	43	50***
Recording Patents-Mail Room Recpts.	20	101***
Receipt Date of Bulk Pat. Docs. Returned by End of Month		June 6-June19, 1989***
Recording Trademarks	20	39***
Receipt Date of Bulk Trademark Documents Returned by End of Month		Sept. 5-Sept. 19, 1989***
Avg. Days from Issue Fee Payment to Issue Date	90-100	81
Issue Fee Receipts Mailed	4 weeks prior to Issue Date	+17 Days****
Patent Copies Available	95% on Issue Date	+88 Days****
Trademark Copies Available	95% on Issue Date	99% on Issue Date

[1] Unless otherwise noted.

* The 5% of orders for which fiche are not on site are not included in calculations.

** Large volume of pending marks has resulted in delays in receipt of drawings in the Trademark Search Library.

*** Reductions of 37 days in patents-new applications, 24 days in patents-Mail Room receipts, and 29 days in trademarks since last month.

**** Contractor difficulties in keeping up with the increase in the quantities of patents being issued.

Dec. 1, 1989

THERESA A. BRELSFORD
Assistant Commissioner
for Administration

PATENT NOTICES

Certificates of Correction For Week of December 26, 1989

Re. 32,898	4,774,473	4,799,964	4,817,715
4,271,040	4,775,406	4,800,254	4,818,419
4,282,233	4,775,871	4,800,439	4,818,425
4,545,435	4,775,903	4,800,464	4,818,437
4,571,333	4,776,360	4,800,613	4,819,237
4,577,774	4,779,230	4,801,141	4,819,372
4,672,972	4,780,367	4,801,573	4,819,556
4,673,642	4,780,591	4,801,609	4,820,639
4,677,368	4,781,549	4,802,229	4,820,890
4,683,669	4,783,283	4,803,293	4,821,280
4,687,546	4,784,328	4,803,738	4,823,069
4,691,159	4,784,635	4,804,398	4,823,153
4,693,101	4,785,089	4,804,760	4,823,193
4,701,299	4,785,130	4,805,453	4,824,245
4,708,731	4,786,050	4,505,540	4,824,537
4,714,452	4,786,124	4,805,660	4,824,819
4,725,097	4,786,383	4,806,798	4,825,054
4,725,473	4,786,398	4,806,889	4,825,151
4,735,262	4,786,744	4,807,044	4,825,173
4,744,084	4,787,434	4,807,197	4,825,272
4,744,840	4,787,603	4,807,976	4,825,641
4,746,460	4,787,978	4,808,635	4,825,738
4,746,760	4,787,981	4,809,165	4,826,490
4,748,267	4,789,373	4,809,994	4,827,048
4,750,955	4,789,446	4,810,302	4,827,077
4,752,925	4,789,790	4,810,779	4,827,087
4,754,909	4,790,291	4,811,394	4,827,345
4,755,812	4,790,850	4,811,862	4,827,910
4,760,772	4,791,208	4,812,582	4,828,095
4,761,131	4,791,608	4,812,911	4,828,631
4,763,279	4,792,545	4,813,064	4,828,809
4,765,247	4,793,469	4,814,441	4,828,941
4,766,134	4,793,957	4,814,644	4,830,764
4,766,468	4,794,222	4,815,068	4,831,440
4,766,506	4,794,522	4,815,323	4,831,651
4,766,726	4,794,597	4,815,432	4,836,743
4,766,970	4,795,051	4,815,527	4,838,449
4,767,824	4,795,340	4,815,687	4,842,861
4,770,840	4,797,821	4,815,856	4,851,778
4,772,684	4,798,393	4,815,918	
4,773,749	4,798,987	4,817,177	

SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

Box _____
Commissioner of Patents and Trademarks
Washington, D.C. 20231

Box 3	Mail for the Office of Personnel from NFC.
Box 4	Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and International Affairs.
Box 5	"No fee" mail related to trademarks.
Box 6	Mail for the Office of Procurement.
Box 7	Reissue applications for patents involved in litigation and subsequently filed related papers.
Box 8	All papers for the Office of the Solicitor except communications relating to pending litigation.
Box 9	Coupon orders for U.S. patent and trademark copies.
Box 10	Orders for certified copies of patent and trademark applications.
Box 11	Electronic Ordering Service (EOS).
Box 12	Contributions to the Examiner Education Program.
Box 13	Mail for the Employee and Labor Relations Division.
Box 200	Mail relating to PTO Bicentennial Celebration.
Box AF	Expedited procedure for processing amendments and other responses after final rejection.
Box FWC	Requests for File Wrapper Continuation Applications.
Box Interference	Communications relating to interferences and applications and patents involved in interference.
Box Issue Fee	All communications following the receipt of a PTOL-85, "Notice of Allowance and Issue Fee Due," and prior to the issuance of a patent should be addressed to Box Issue Fee, unless advised to the contrary. Assignments are the exception. Assignments should be submitted in a separate envelope and not be sent to Box Issue.
Box ITU	All Intent to Use documents excluding the initial application and amendments to allege use.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Non Fee Amendment	Non-fee amendments to patent applications. (Use Box AF for responses after final rejection.)
Box OED	Mail for the Office of Enrollment and Discipline.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Mail relatrd to Reexamination.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent application *prior* to the Office's standard notification (return post card or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").
PATENT APPLICATION	New patent application and associated papers and fees.
TRADEMARK APPLICATION	New trademark application and associated papers and fees.
Box Assignments	All assignment documents except those filed in new patent applications.

Reference Collection of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 844-1747
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage: Z. J. Loussac Public Library	(907) 261-2916
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7607
Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale Patent Clearinghouse	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2347
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami-Dade Public Library	(305) 375-2665
	Orlando: University of Central Florida Libraries	(407) 275-2562
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institite of Technology	(404) 894-4508
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis-Marion County Public Library	(317) 269-1741
Iowa	Des Moines: State Library of Iowa	(515) 281-4118
Kentucky	Louisville Free Public Library	(502) 561-8617
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library and Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 376
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4281
Nebraska	Lincoln: Engineering Library, University of Nebraska-Lincoln	(402) 472-3411
Nevada	Reno: University of Nevada-Reno Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7782
	Piscataway: Library of Science and Medicine, Rutgers University	(201) 932-2895
New Mexico	Albuquerque: University of New Mexico General Library	(505) 277-4412
New York	Albany: New York State Library	(518) 473-4636
	Buffalo and Erie County Public Library	(716) 858-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D.H. Hill Library, North Carolina State University	(919) 737-3280
Ohio	Cincinnati and Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6175
	Toledo/Lucas County Public Library	(419) 259-5212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 744-7086
Oregon	Salem: Oregon State University	(503) 378-4239
Pennsylvania	Philadelphia, The Free Library of	(215) 686-5331
	Pittsburgh, Carnegie Library of	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 455-8027
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2371
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Stevenson Science Library,Vanderbilt University	(615) 322-2775

Reference Collection of U. S. Patents Available for Public Use in Patent Depository Libraries—(continued)

State	*Name of Library*	*Telephone Contact*
Texas	Austin: McKinney Engineering Library, University of Texas at Austin	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext.2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: Virginia Commonwealth University Library	(804) 367-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin Madison	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF November 18, 1989

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	5-26-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director	6-16-87
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. V. FISHER, Acting Director	4-15-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	5-14-87
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	1-28-87
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	10-15-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	2-27-87
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	11-16-87
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX,Director	6-7-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	8-18-87
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260 STEWART LEVY, Acting Director	9-21-87
DESIGN, GROUP 290—K. L. CAGE, Director	2-6-86
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	10-21-88
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	4-13-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	1-15-88
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	2-26-88
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	1-3-89

Expiration of patents: The patents within the range of numbers indicated below expire during November 1989, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,702,012 to 3,704,468 inclusive
Plant Patents ..... None

REEXAMINATIONS

DECEMBER 26, 1989

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,062,881 (1179th)

SULFIDE CONTAINING STABILIZERS

Thomas G. Kugele, Cincinnati, Ohio, assignor to Morton Thiokol Inc.

Reexamination Request No. 90/001,534, Jun. 21, 1988.
Reexamination Certificate for Patent No. 4,062,881, issued Dec. 13, 1977, Ser. No. 492,969, Jul. 26, 1974.
Filed Jun. 21, 1988, Ser. No. 492,969
Int. Cl.[4] C08H *3/00*; C07F *7/22*
U.S. Cl. 260—399

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1, 3–44, 46–54, 56–58** and **61** is confirmed.

Claims **2, 45, 55, 59** and **60** were previously disclaimed.

1. A monoorganotin or diorganotin mercaptoalkyl ester of a carboxylic acid or mercapto hydroxyalkyl ester of a carboxylic acid mono or poly sulfide useful as a stabilizer for improving the resistance to deterioration of vinyl chloride polymers when heated at 350° F., containing at least one tin atc having one to two hydrocarbyl groups having from 1 to 20 carbon atoms and selected from the group consisting of alkyl, aryl, cycloalkyl, aralkyl and alkenyl and linked to the tin through carbon, at least one mercaptoalkyl ester of a carboxylic acid group linked to tin through the sulfur of the mercaptoalkyl group and at least one mono or polysulfide sulfur group bonded exclusively to tin, the organotin compound having an amount of tin within the range from 10 to 42% by weight and an amount of sulfur within the range from 8 to 42% by weight.

REISSUES

DECEMBER 26, 1989

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,134

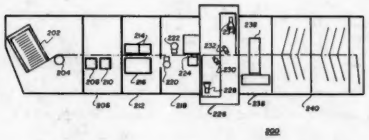
HIGH SPEED DOCUMENT ENCODING SYSTEM

Gerald L. Johnson, Garland, Tex.; Eugene C. Nolting, Carson City, Nev., and John H. Allen, Arlington, Tex., assignors to BancTec, Inc., Dallas, Tex.

Original No. 4,492,161, dated Jan. 8, 1985, Ser. No. 307,537, Oct. 1, 1981. Application for reissue Jan. 8, 1987, Ser. No. 4,181

Int. Cl.[4] B41J *1/60*

U.S. Cl. 101—109 **24 Claims**



202

23. Apparatus disposed at an encoding station for encoding discrete documents moving through said station, said apparatus comprising:

a plurality of stationary character imprinters:

a plurality of striking means , each of said plurality of striking means positioned, when activated, to strike a particular and corresponding one of said plurality of stationary character imprinters;

ink bearing ribbon means disposed between said striking means and said character imprinters for transferring character imprints to said documents;

means transporting said discrete documents through said encoding station between said plurality of character imprinters and said plurality of striking means; and

control means for advancing said ribbon in the direction of document travel and for activating particular ones of said plurality of striking means in a preselected sequence and at preselected times only in response to a document being present at said encoding station, thereby to character imprint said document as it is being transported through said encoder station,

said ribbon not being advanced in the direction of document travel during the absence of a document at said encoding station.

Re. 33,135

PUMP APPARATUS

William F. Wanner, Sr., deceased, late of Minneapolis, and William F. Wanner, Jr., trustee, Excelsior, both of Minn., assignors to Recovery Engineering, Minneapolis, Minn.

Original No. 4,534,713, dated Aug. 13, 1985, Ser. No. 639,911, Aug. 10, 1984. Application for reissue Aug. 10, 1987, Ser. No. 84,424

Int. Cl.[4] F04B *17/00*

U.S. Cl. 417—377 **11 Claims**

1. Apparatus for filtering a liquid, comprising:

a pump having a reciprocable rod and plunger, said pump having a space separated into driving and pumping chambers by said plunger, said driving chamber having a first end closure, said rod extending from said plunger through said first end closure, said pump being in fluid communication with polluted liquid from a liquid source;

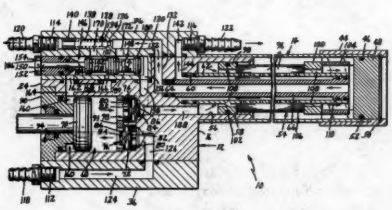
means, attached to said rod, for driving said pump;

means for filtering purified liquid and unfiltered concentrate liquid fractions from the polluted liquid;

first means for communicating the polluted liquid from the pumping chamber of said pump to said filtering means;

second means for communicating the purified liquid frm said filtering means to an outlet port;

third means for communicating unfiltered concer liquid from said filtering means to a vent port, said third communicating means including valve meanc for selectively directing concentrate liquid along one of a first path from said filtering means to the drive chamber of said pump and a second path from the drive chamber to said vent port, said valve means including a movable shuttle and stem, said valve means further having a passage in which said shuttle moves between a first position for directing the concentrate liquid along the first path and a second position for directing the concentrate liquid along the second path;



said passage having a second end closure, said stem extending from said shuttle through said second end closure, said shuttle having a stem end and an end opposite, said rod, said plunger, said stem and said shuttle having cross-sectional areas normal to directional movements so that relative displacement volumes through which said rod, said plunger, said stem and said shuttle move on opposite sides of said shuttle and on opposite sides of said plunger are the same;

third means for communicating *concentrate liquid* from said driving chamber to the stem end of the shuttle *to move said shuttle between said first and second positions*; and

fourth means for communicating *polluted liquid* from said pumping chamber to the end opposite the stem of said shuttle *to move said shuttle between said first and second positions.*

Re. 33,136

BURNER FOR GAS BLOW TORCH

Claude Courrege, La Haillan, France, assignor to Rippes S.A., France

Original No. 4,631,023, dated Dec. 23, 1986, Ser. No. 813,760, Dec. 27, 1985. Continuation-in-part of Ser. No. 345,749, Feb. 4, 1982, abandoned, which is a continuation of Ser. No. 40,953, May 21, 1979, abandoned. Application for reissue Mar. 7, 1988, Ser. No. 171,108

Claims priority, application France, May 29, 1978, 78 16497

Int. Cl.[4] F23D *14/14*

U.S. Cl. 431—329 **12 Claims**

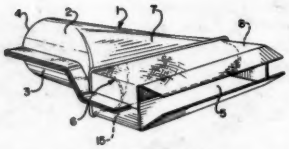
7. A gas burner for burning a high flow rate gas, said burner comprising:

a feed line of a high flow rate gas;

an adaptation chamber having first and second sections, said first section comprising a first entrance portion connected to said feed line and a first outlet orifice, and extending from said entrance portion to said first outlet orifice, a first top wall, a first bottom wall and first and second opposite lateral

walls, said first top wall and bottom wall converging inwardly towards each other and increasing in width from said entrance portion to said outlet orifice and said first and second opposite lateral walls diverging from the first entrance portion to the first outlet orifice, said second portion comprising a tubular portion having an inlet orifice connected to said first outlet orifice and a second outlet orifice and a second top wall, and a second bottom wall which are substantially parallel to each other and extend respectively from said first top wall and said first bottom wall, and third and fourth substantially parallel lateral walls which extend respectively from said first and said second lateral walls;

two deflectors connected to said second section and extending respectively from said second top wall and said second bottom wall, said first and second deflectors converging towards each



other from said second outlet orifice and having two respective parallel front edges, spaced from each other by a first distance;

a curved diffusion grill having a curvature axis which is parallel to said second top and bottom walls and extends perpendicularly to said third and fourth lateral walls, said curved diffusion grill having two substantially parallel longitudinal edges which are respectively connected to said second top wall and to said second bottom walls, two elongated zones respectively formed between said grill and said second top and bottom walls, and two lateral curved edges which are respectively connected to said third and fourth lateral walls, said two longitudinal zones respectively delimiting with said second top and bottom walls two passageways each forming a dead space into which the flame does not spread.

Re. 33,137

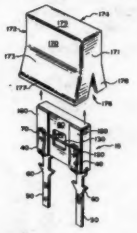
SUBMINIATURE FUSE

Leon Gurevich, St. Louis, and Vernon R. Spaunhorst, Washington, both of Mo., assignors to Cooper Industries, Inc., Houston, Tex.

Original No. 4,612,529, dated Sep. 16, 1986, Ser. No. 715,799, Mar. 25, 1985. Application for reissue Apr. 17, 1987, Ser. No. 39,541

Int. Cl.[4] H01H *85/4*

U.S. Cl. 337—255 **59 Claims**



1. An electrical circuit protector which is adapted to be inserted into a printed circuit board, comprising:

(a) a first terminal and a second terminal each having a top portion and a bottom portion;

(b) insulating means having two ends for electrically and thermally insulating said first terminal from said second terminal and for holding said first terminal and said second terminal in substantially parallel relationship and spaced apart from each other by a predetermined distance, said top portions of said first terminal and said second terminal being disposed intermediate the ends of said insulating means;

(c) a fusible conductor connected between said first terminal and said second terminal and supported on said insulating means, the combination of said insulating means, said fusible conductor, and the portions of said first terminal and said second terminal defining an assembly;

(d) an electrically insulative material coating said assembly; and

(e) unitary one piece enclosure means for housing said assembly.

PLANT PATENTS

GRANTED DECEMBER 26, 1989

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,082

PLUM TREE, RANCHO OCHO

John M. Garabedian, P.O. Box 7883, Fresno, Calif. 93747

Filed Nov. 7, 1988, Ser. No. 268,348
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—38 1 Claim

1. A new and distinct variety of plum tree substantially as illustrated and described and which is denominated varietally by the name "Rancho Ocho", the new variety of plum tree being somewhat similar to the Santa Rosa-Two Plum Tree (U.S. Plant Pat. No. 5,904) which matures at approximately the same time of the season, but from which it is distinguished therefrom, and characterized principally as to novelty, by bearing semi-freestone fruit which are ripe for commercial harvesting and shipment approximately June 20 through June 26 under the ecological conditions prevailing at Fresno, Calif.

7,083

DISTINCT VARIETY OF GERANIUM PLANT NAMED FOX

Christa Hofmann, Dresden, German Democratic Rep., assignor to Oglevee Ltd., Connellsville, Pa.

Filed Jan. 18, 1989, Ser. No. 298,341
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct variety of geranium plant characterized by a compact, upright branched plant of excellent conformation, dark foliage which compliments the brilliant two-tone effect of the florets, a healthy foliage and a brilliant fluorescent fuschia color substantially as herein shown and described.

7,084

DISTINCT VARIETY OF BEGONIA PLANT NAMED MARIANDEL

Jan Man, Lisse, Netherlands, assignor to Oglevee Ltd., Connellsville, Pa.

Filed Sep. 29, 1988, Ser. No. 251,655
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct variety of Begonia characterized by superior compact growth, flowering, long lasting with continuous bud production and contrast of pink bloom on dark green foliage as shown and described herein.

7,085

DISTINCT VARIETY OF GERANIUM PLANT NAMED CHERRY

Christa Hofmann, Dresden, German Democratic Rep., assignor to Oglevee Ltd., Connellsville, Pa.

Filed Jan. 18, 1989, Ser. No. 298,509
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct variety of geranium plant characterized by a bright, fluorescent, crimson to ruby red color accented by dark green foliage, compact, well branched and upright plant and good outdoor performances as herein shown and described.

7,086

DISTINCT VARIETY OF GERANIUM PLANT NAMED REBECA

Christa Hofmann, Dresden, German Democratic Rep., assignor to Oglevee Ltd., Connellsville, Pa.

Filed Jan. 18, 1989, Ser. No. 298,510
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct variety of geranium plant characterized by a bright coral bloom color, an attractive medium green foliage with a definite dark green zone, and a vigorous plant growth as herein shown and described.

7,087

DISTINCT VARIETY OF GERANIUM PLANT NAMED LAURA

Christa Hofmann, Dresden, German Democratic Rep., assignor to Oglevee Ltd., Connellsville, Pa.

Filed Jan. 18, 1989, Ser. No. 298,511
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—68 1 Claim

1. A new and distinct variety of geranium plant characterized by a bright lavendar-pink bloom having a white eye as accent, a compact plant habit with good branching and an attractive green foliage, and long lasting quality under most weather conditions, substantially as herein shown and described.

7,088

AFRICAN VIOLET PLANT NAMED DéCENNIE

Reinhold Holtkamp, Sr., Werther Strasse 112, D4294 Isselburg, Fed. Rep. of Germany

Filed Sep. 30, 1988, Ser. No. 251,322
Int. Cl.[4] A01H *5/00*
U.S. Cl. Plt.—69 1 Claim

1. A new and distinct cultivar of African violet named Décennie, as described and illustrated, and particularly characterized by its single, dark purplish pink flowers with wavy, frilled edges; strong, upright flower stems that curve slightly toward the center to form a tight bouquet above the leaves; medium green, slightly serrated leaves; profuse flowering, vigorous growth habit, flowering 9–10 weeks after potting, and its long-lasting and non-dropping flowers.

PATENTS

GRANTED DEC. 26, 1989

ERRATA

For CLASS	See PATENT NO.
427-356	4,889,073
606-069	4,889,110
606-108	4,889,118
606-216	4,889,120
132-286	4,889,141
148-012	4,889,582
562-815	4,889,661
422-211	4,889,696
428-304	4,889,717
428-343	4,889,718
435-194	4,889,818
521-115	4,889,908
047-009	4,889,913
525-458	4,889,915
525-054	4,889,916
330-004	4,890,075
364-786	4,890,127

PATENTS

GRANTED DECEMBER 26, 1989

GENERAL AND MECHANICAL

4,888,825

FULL VIEW WELDING SHIELD

Timo Hakala, Valkkinen, and Reijo Lehtonen, Siiksjärvi, both of Finland, assignors to Euromaski OY, Forssa, Finland

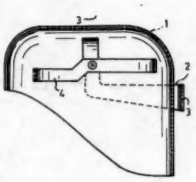
PCT No. PCT/FI85/00012, § 371 Date Oct. 31, 1985, § 102(e) Date Oct. 31, 1985, PCT Pub. No. WO85/03429, PCT Pub. Date Aug. 15, 1985

Continuation of Ser. No. 787,797, Oct. 3, 1985, abandoned. This PCT application Feb. 7, 1985, Ser. No. 195,470

Claims priority, application Finland, Feb. 10, 1984, 840540

Int. Cl.[4] A61F *9/06*

U.S. Cl. 2—8 **19 Claims**



1. A protecting device in the form of a welding shield comprising:

(a) a protecting part for being positioned on a head of a user for protecting the head from radiation and sparks, said protecting part substantially restricting passage of injurious radiation towards the head and being substantially transparent to a view of the user looking through said protective part from an inside thereof, whereby said protective part provides a full-view face shield;

(b) a visor being pivoted for movement about an outside surface of said protecting part, said visor having a first position substantially in front of the eyes of the user and a second position away from the eyes of the user, said visor having a protecting glass means for protecting the eyes of the user from a welding arc, whereby the user has a clear view of surroundings with said visor in said second position and with said visor in said first position by looking above or below said visor.

4,888,826

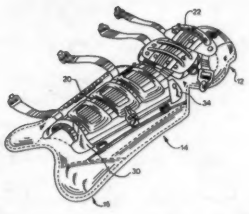
LEG PROTECTOR

Charles Parsons, Jr., Schaumburg, Ill., and Chen C. Fang, Taipei Hsien, Taiwan, assignors to Parsons Officials Supplies, Inc., Schaumburg, Ill.

Filed Nov. 9, 1988, Ser. No. 269,054

Int. Cl.[4] A41D *13/00*

U.S. Cl. 2—22 **4 Claims**



1. An improved leg protector of the type having a hard shell portion and a padding portion arranged to be strapped to the leg of the wearer, wherein the improvement comprises releasable fastener means arranged on the periphery of the shell to engage with releaseable fastener means on the periphery of the padded portion, and said releaseable fastener means on the periphery of the padded portion including pockets for holding the corners of the shell.

4,888,827

SHIRT AND TIE GARMENT PROTECTOR

Roger H. Lee, 1366 E. Sigfrid St., Eagan, Minn. 55123

Filed Dec. 22, 1988, Ser. No. 288,628

Int. Cl.[4] A41D *27/12*

U.S. Cl. 2—52 **2 Claims**

1. A garment protector consisting of an elongate tube formed of flexible waterproof material, having opposed creases forming opposed edges in the elongate tube, and having identical front and back body portions between the edges, and having a first end edge of the elongate tube shaped to extend inwardly in a symmetric V shape with indentation from the opposed creased edges thereof.

4,888,828

SLEEPING BAG DEVICE

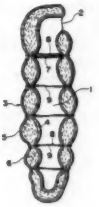
Isamu Tatsuno, Osaka, Japan, assignor to Mont-Bell Co., Ltd., Osaka, Japan

Filed Oct. 11, 1988, Ser. No. 255,393

Claims priority, application Japan, Oct. 26, 1987, 62-164275; Aug. 1, 1988, 63-102153

Int. Cl.[4] A41D *13/00*

U.S. Cl. 2—69.5 **15 Claims**



5. A sleeping bag device comprising:

a warmth-retaining bag comprising an inner lining, an outer lining and a heat-insulating material filling a space defined by said inner and outer linings, said warmth-retaining bag defining an elongated inner chamber for accommodating a

user's body and a head opening adapted for a user to enter or leave said inner chamber; and

a plurality of elastic threads fixed with a sewing thread onto either one of said inner and outer linings, said elastic threads disposed at a substantially constant pitch in a longitudinal direction of said warmth-retaining bag over the entire length of said warmth-retaining bag.

4,888,829

GLOVES

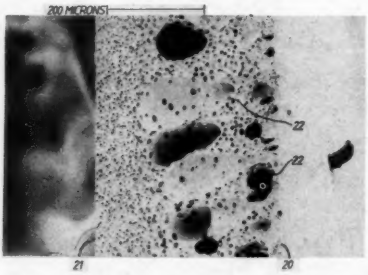
George J. Kleinerman, and John M. Woodcock, both of King's Lynn, England, assignors to Porvair Limited, King's Lynn, England

Continuation of Ser. No. 921,189, Oct. 21, 1986, abandoned. This application Oct. 27, 1988, Ser. No. 263,987

Claims priority, application United Kingdom, Oct. 21, 1985, 8525866

Int. Cl.[4] A41D *19/00*

U.S. Cl. 2—167 **16 Claims**



1. Flexible, form-fitting, seamless gloves which are permeable to water vapor but impervious to liquid water which are constituted by a continuous water-vapor-permeable layer of elastomeric polyurethane material, the gloves having a selected permeability to water vapor and affording an outer surface having a selected resistance to liquid water penetration under a pressure differential between the faces of the material, whereby said outer surface is hydrophobic; the gloves being of a continuous water-vapor-permeable layer and being free of fiber reinforcement; the gloves having the following properties as measured on samples cut from the back of the hand of the glove:

(a) a thickness of 0.10 to 0.45 mm,

(b) the selected permeability to water vapor being a water vapor permeability (as defined herein) in the range of 75 to 200 grams/m^2/hr,

(c) the selected resistance to liquid water penetration resulting in the outer surface being hydrophobic being a hydrostatic head (as defined herein) in the range of 300 to 700 cm of water,

(d) a tensile tear factor (as herein defined) of 0.20 to 1.20,

(e) an initial modulus at 25% elongation not in excess of 0.35 kg/cm, and

(f) an elongation at break (as herein defined) of at least 200%.

4,888,830

QUICK RELEASE ADJUSTABLE TENSION STRAP

Allen L. Putnam, 4350 Ryan Way #1, Carson City, Nev. 89706

Filed Dec. 8, 1988, Ser. No. 281,803

Int. Cl.[4] A41F *9/00*

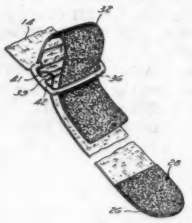
U.S. Cl. 2—327 **16 Claims**

1. A releasable strap device for exerting tension on a desired object, said strap device comprising:

a flexible main strap having a first longitudinal end and a second longitudinal end, said first longitudinal end being attached to the desired object and said second longitudinal end being generally provided with a first connecting means, said first connecting means being compressively yet releasably conjoinable with an analogous second connecting means;

a connector strap segment attached to a point on said main strap, said connector strap segment being provided with said second connecting means compressively conjoinable with said first connecting means;

a closed-loop connector attached at a point on the desired



object, said closed loop connector being positioned, sized, and configured to permit said main strap may be longitudinally drawn therethrough to a desired point at which said first connecting means may be compressively conjoined with said second connecting means to prevent return movement of said main strap through said closed-loop connector until such time as said first connecting means is detached from said second connecting means.

4,888,831

ADJUSTABLE HEAD BAND SUSPENSION SYSTEM FOR USE WITH HARD HAT SHELL

Richard A. Oleson, Lexington, Ky., assignor to E. D. Bullard Company, Sausalito, Calif.

Filed Jun. 10, 1988, Ser. No. 204,742

Int. Cl.[4] A42B *1/22, 3/02*

U.S. Cl. 2—420 **21 Claims**

1. In combination with a safety hat shell, an adjustable head band suspension system comprising

a head encircling head strap having overlapping rear end portions,

an arc shaped channel adapted to conform to the back of a wearer's head, said overlapping end portions being slidably movable along said channel,

means separate and detached from said head strap for connecting said channel to a rear end portion of said shell,

means for connecting a forward end position of said head strap to a forward end portion of said shell, and

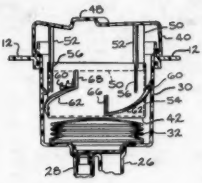
means connected to said channel for adjusting and maintaining a desired length of overlap of said overlapping end portions.

4,888,832

TOILET WITH MANUAL FLUSH

David B. Cameron, Milford, Mich., assignor to Thetford Corporation, Ann Arbor, Mich.

Filed Jun. 17, 1988, Ser. No. 208,738
Int. Cl.[4] E03D 5/01
U.S. Cl. 4—321 10 Claims



1. In a toilet having a bowl and a flush water storage tank, a pump comprising:

a housing;

a bellows disposed within said housing defining a pump chamber having an inlet in communication with said storage tank and an outlet in communication with said bowl, said bellows being compressible in a predetermined direction to evacuate said pump chamber; and

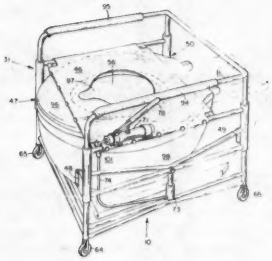
actuator means engaging said bellows and operable for compressing said bellows, said actuator means being rotatable about an axis parallel to the direction of compression of said bellows and movable in translation in the direction of compression of said bellows upon rotation of said actuator means so as to compress said bellows.

4,888,833

CART FOR POSITIONING A BODY ON A TOILET

Gilbert C. Garcia, 163 Tabard Dr., San Antonio, Tex. 78213, and Rodolfo G. Valdes, 11011 Reverie La., San Antonio, Tex. 78216

Filed Feb. 16, 1988, Ser. No. 155,882
Int. Cl.[4] A61G 7/02; A47K 11/04
U.S. Cl. 4—480 11 Claims



1. An apparatus enabling use of a toilet by an individual, which toilet has an excretion chamber opening, comprising:

a support structure adapted to be positionable relative to an excretion chamber opening of a toilet;

supporting means for supporting the body of an individual, said supporting means being movable to rest on said toilet and said supporting means defining a passage for enabling passage of defecation from said body through the excretion chamber opening of said toilet;

means, operatively connected between said support structure and said supporting means, for raising said supporting means off of said toilet to enable horizontal movement of said support structure relative to said toilet; and

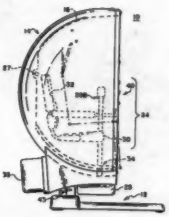
means for centering said passage above the excretion chamber opening of said toilet, said centering means comprising guides which are rotatably mounted to said support structure for guiding horizontal movement of said support structure relative to said toilet.

4,888,834

BATHING SYSTEM

Robert E. Vago, Northbrook, Ill., assignor to Malmros Holding, Inc., Morton Grove, Ill.

Filed Feb. 23, 1988, Ser. No. 159,192
Int. Cl.[4] A47K 3/022
U.S. Cl. 4—540 20 Claims



1. A bathing system comprising:

a tub means adapted to hold water;

a seat mounted in a position suitable for a bather to sit in it;

means for moving said tub means between a bathing position in which it holds water and an entering and exiting position in which it is upright without substantially changing said position of said seat, whereby the bather may remain seated while said tub means moves between an entering and exiting position and a bathing position;

said tub means having a depth, a height and a width with said depth extending from an edge forming an opening downwardly to a closed bottom whereby when said tub means is in bathing position, said depth extends downwardly into said water and when said tub means is in an entering position, said depth is horizontal;

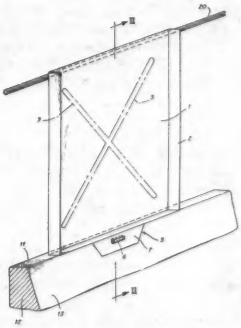
a sparging system means for blowing warm air into said tub means; said tub means having a concave tub chamber; said seat being located when said tub means is in said entering and exiting position such that the edge of said tub means extends beyond said seat, whereby warm air blows within the concave tub chamber around said patient while said patient is recessed in said chamber.

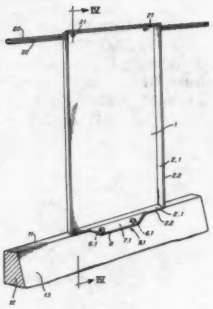
4,888,835

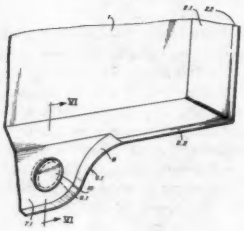
SPLASHGUARD FOR A BATHTUB

Heinz Baumann, Zurich, Switzerland, assignor to Spirella AG, Embrach, Switzerland

Filed Jan. 5, 1989, Ser. No. 293,636
Claims priority, application Switzerland, Jan. 6, 1988, 033/88
Int. Cl.[4] A47K 3/22
U.S. Cl. 4—609 19 Claims







1. A movably suspended splashguard for a bathtub, comprising:

a substantially flat, substantially rectangular panel member (1) having a flange (2) adjoining and extending from said panel member at least laterally on the opposite sides thereof and on the bottom thereof;

the flange portion at the bottom of the splashguard being slidable on an upper surface (11) of a rim (12) of the bathtub;

said flange being directed inwardly toward the interior of the bathtub and having at least an outer edge portion which extends substantially perpendicular to said panel member of the splashguard; and

said flange portion at the bottom of the splashguard having an extension (5), extending below the upper surface (11) of the rim (12) of the bathtub, said extension (5) having a magnetic means for magnetically adhering to an inner face (13) of the rim (12) of the bathtub to fix the position of the splashguard relative to the bathtub.

4,888,836

LIGHTER-THAN-AIR-FURNITURE

William A. Calderwood, 13660 N. 94th Dr., Peoria, Ariz. 85345

Filed Apr. 10, 1989, Ser. No. 335,896

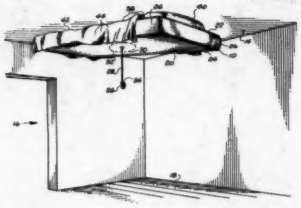
Int. Cl.[4] A47C *27/08*

U.S. Cl. 5—10 B **20 Claims**

1. An article of furniture for support of a body while said article is in a sunk position and for being selectively positioned in one of said sunk position and a levitated position, said article comprising:

a bladder having a top surface configured to support said body and having a bottom surface configured for stable placement on a generally horizontal surface; and

a tether coupled to said bottom surface of said bladder, said tether being for moving said article from said levitated



position to said sunk position, said bladder maintaining substantially the same configuration in its levitated position as in its sunk position, said levitated position being obtained with the aid of a low density substance.

4,888,837

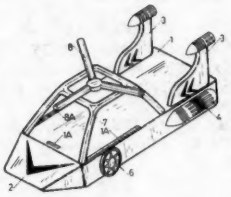
TOY BED TRANSFORMERS

Ted T. H. Wang, Room 401, 168, Chung Cheng 4 Road, Kaohsiung, Taiwan

Filed Aug. 11, 1987, Ser. No. 84,234

Int. Cl.[4] A47D *7/01, 15/00*; A47C *21/00*

U.S. Cl. 5—93 R **9 Claims**



1. A toy bed transformer which comprises:

a mattress having at least two releasable fastening means at different locations thereon, at least one being located on the top portion of the mattress and at least one being located on a side or end portion of the mattress, and

at least two inflatable toy accessory means having matching releasable fastening means,

wherein the at least two inflatable toy accessory means can be interchangeably fasten to the mattress by their respective fastening means at the different locations thereon whereby the mattress and the inflatable accessory means simulate a vehicle.

4,888,838

MATTRESS SUPPORT

Ronald E. Pelski, 30 Chestnut St., Ware, Mass. 01082

Filed Jul. 25, 1988, Ser. No. 223,620

Int. Cl.[4] A47C *15/00*

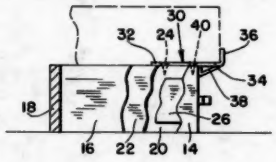
U.S. Cl. 5—207 **3 Claims**

1. A bedstead comprising a box-like frame including vertical spaced end walls and side walls secured at their respective ends and forming a continuous rectangular frame open at top and bottom,

a plurality of solid parallel spaced partitions similar to the end walls and individually connecting the side walls and forming a plurality of drawer compartments in the open frame, said partitions, end walls and side walls having top

surfaces, and a mattress or mattress support bracket on each partition and end wall, said brackets being aligned along a side wall of the frame,

each bracket comprising a flat section positioned flatly on and secured to the top surface of a partition or end wall, said sections being significantly shorter than any partition or end wall and extending outwardly of the frame, over-



hanging the same, a stop at the outboard end of the section, said stops being directed upwardly in a row, and a downwardly directed stop on each bracket section, the downwardly directed stops being located between the ends of the sections so that the two stops on each bracket are spaced apart, the downwardly directed stops abutting the adjacent side wall of the frame.

4,888,839

METHOD AND APPARATUS FOR TREATING ELONGATE TEXTILE MATERIALS

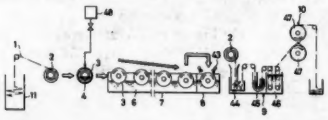
Hiroshi Yoshida, Kurobe, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed Dec. 8, 1988, Ser. No. 281,284

Claims priority, application Japan, Dec. 17, 1987, 62-321007

Int. Cl.[4] D06B *3/09, 23/04*

U.S. Cl. 8—149.1 **30 Claims**



1. A method of treating an elongate textile material with a treatment liquid, comprising the steps of:

(a) sealingly holding in a container an elongate textile material to be treated which is liquid-permeably wound on a bobbin and a treatment liquid while keeping a gaseous phase portion within the container; and

(b) conveying the container longitudinally through an elongate high-temperature treatment zone to heat the treatment liquid at a predetermined temperature while rotating the container together with the bobbin held therein to cause the textile material to move alternately through the treatment liquid and the gaseous phase portion within the container, thereby treating the textile material with the treatment liquid.

11. An apparatus for treating an elongate textile material with a treatment liquid, comprising:

(a) a bobbin for winding thereon an elongate textile material and having a liquid-permeable structure;

(b) a container for sealingly holding therein said bobbin and a treatment liquid with a gaseous phase portion kept within said container, said bobbin being immovably held within said container;

(c) means defining an elongate high-temperature treatment zone;

(d) a conveyor device for conveying said container longitudinally through said elongate high-temperature zone for heating said treatment liquid at a predetermined temperature; and

(e) a rotating device for rotating the container to cause the textile material to move alternately through said treatment liquid and said gaseous phase portion while said container is being conveyed by said conveyor device.

4,888,840

METHOD FOR MERCERIZING TEXTILE FABRIC WEBS AND APPARATUS FOR CARRYING OUT THE METHOD

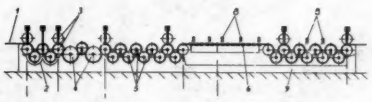
Hans Weber, Uzwil, Switzerland, assignor to Benninger AG, Uzwil, Switzerland

Continuation of Ser. No. 841,659, Mar. 20, 1986, abandoned. This application Mar. 13, 1989, Ser. No. 323,200

Claims priority, application Switzerland, Mar. 21, 1985, 1250/85

Int. Cl.[4] D06B *3/12, 7/08*

U.S. Cl. 8—151 **5 Claims**



1. A method of hot-mercerizing a textile fabric web comprising

passing the web through an impregnation zone to impregnate the web in a hot lye bath,

passing the impregnated web from the hot lye bath through a positive cooling zone where it is positively cooled to less than about 25° C.,

passing the cooled web from the cooling zone through a residence zone,

passing the web from the residence zone through a stretching zone having a stretching mechanism in the form of a tensioning frame having an intake area of conical section such that the web is subjected to a controlled and continuous stretching,

after said residence zone, and no later than said tensioning frame, reheating the web by the application of hot weak lye to reduce shrinkage forces in the web, and

guiding the web from the hot lye bath through the cooling zone and the residence zone to the tensioning frame on cylindrical rolls forming a continuously constrained web path to avoid uncontrolled and excessive shrinkage.

4,888,841

METHOD AND APPARATUS FOR MOLDING SHOE INSERTS

Glenn W. Cumberland, Mt. Pleasant, Mich., assignor to Foot Technology, Inc., St. Louis, Mo.

Filed May 8, 1987, Ser. No. 47,657

Int. Cl.[4] A43D *89/00;* **A43B** *13/38*

U.S. Cl. 12—38 **11 Claims**

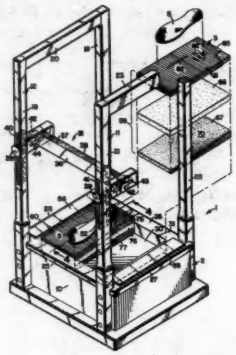
1. A support apparatus for use in molding an insert placed thereon to a user's foot, said support apparatus comprising:

(a) an upper resilient layer of relatively soft foam material capable of substantially molding about a foot of a person placed thereon; and,

(b) a lower resilient layer of foam material; said lower resilient layer being substantially firmer than said upper resilient layer and being capable of providing a support substantially contoured to a bottom of a foot placed on said support apparatus;

(i) said upper and lower resilient layers: being separable from one another, enabling insertion of a member there-

between; and, being constructed and arranged in a manner facilitating molding of said upper resilient layer,



about a user's foot at least partially independently of molding of said lower resilient layer.

4,888,842

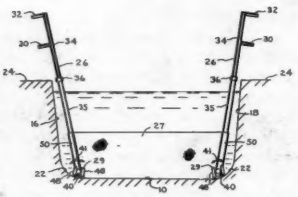
SWIMMING POOL CLEANING MECHANISM

Porter L. McKamey, 7524 Pinewood Dr., Chattanooga, Tenn. 37421, and Phillip M. Maeder, 6921 Sandy Cove Dr., Harrison, Tenn. 37341

Filed Nov. 16, 1988, Ser. No. 271,720

Int. Cl.[4] E04H 3/20

U.S. Cl. 15—1.7 **14 Claims**



1. Mechanism for removing particulate debris from the floor surface of a swimming pool comprising two laterally-spaced pole assemblies adapted to assume upright positions in a swimming pool, a strainer screen extending between the pole assemblies, and roller means attached to the lower end of each pole assembly; said pole assemblies being of sufficient length that when the roller means are engaged with the pool floor surface the upper ends of the pole assemblies are within reach of persons standing on the swimming pool deck, whereby persons on the deck can move the pole assemblies across the pool so that the screen can capture particulates on or near the floor surface.

4,888,843

HOLDER FOR ROTARY PAD

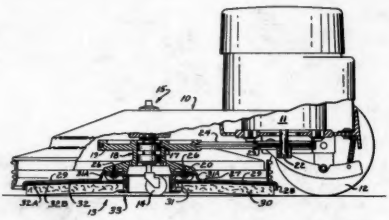
Ronald J. Smith, Carol Stream; Thomas J. Lerch, Chicago, and Rick McLeod, Lake In The Hills, all of Ill., assignors to Hako Minuteman, Inc., Addison, Ill.

Filed Oct. 27, 1988, Ser. No. 263,179

Int. Cl.[4] A47L 11/14

U.S. Cl. 15—98 **4 Claims**

1. Apparatus for mounting a pad having a central aperture to a drive member of a rotary floor care machine comprising: a cylindrical drive collar rigidly mounted to said drive member and having a continuous thread extending over a plurality of convolutions on the inner surface of said collar, the teeth of said thread having a sawtooth profile including an inclined lead-in surface and a generally flat holding surface extending generally radially of the axis of said collar; and a retainer member having a cylindrical insert adapted to be received in said drive collar and a lower peripheral flange, said insert defining a tab means including at least one tab attached to said retainer along a line and having an outer surface defining a segment of thread with teeth having a sawtooth profile including an inclined lead-in surface and a generally flat holding



surface, said thread segment on said tab constructed and arranged for matching threaded engagement with the internal thread on said drive collar, whereby said pad may be mounted by placing said central aperture of said pad over said collar, inserting said insert into said collar and pushing on said flange, thereby causing said tab to ride over the internal thread of said collar until said flange of said retainer member compresses said pad in a region around said central aperture and said holding surfaces of said drive member thread and tab are in engagement.

4,888,844

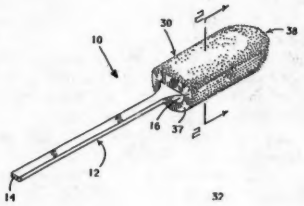
TOOTHBRUSH FOR NATURAL TEETH AND DENTURES

Norman B. Maggs, 222 Fonda Rd., Waterford, N.Y. 12188

Filed Aug. 31, 1988, Ser. No. 238,483

Int. Cl.[4] A46B 9/04

U.S. Cl. 15—106 **9 Claims**



1. A toothbrush for brushing dentures as well as natural teeth comprising:

an elongated body member having an enlarged portion at one end and a handle portion at the other end;

said handle portion being substantially longer than said enlarged portion;

bristles completely covering said enlarged bulbous member;

said enlarged portion having first bristle means thereon suitable for cleaning natural teeth;

shaped second bristle means on said enlarged portion for cleaning dentures;

said first bristle means providing a flat surface;

said shaped second bristle means providing a curved surface; and

two parallel side edges being formed by the junctions between said flat surface and said curved surface.

4,888,845

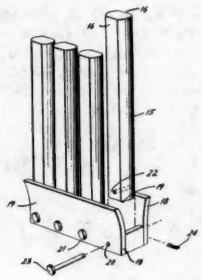
SWEEPING APPARATUS FOR RAILWAY BALLAST REGULATORS

Edmund C. Ramm, Holland, and John J. Nogan, II, South Hampton, both of Pa., assignors to Railway Track-Work Company, Bethayres, Pa.

Continuation-in-part of Ser. No. 775,848, Sep. 13, 1985, abandoned. This application Apr. 15, 1988, Ser. No. 182,140

Int. Cl.[4] A46B *13/02*

U.S. Cl. 15—182 **7 Claims**



1. A railway broom sweeping unit comprising:

broom reel;

a plurality of broom element holders affixed to the broom reel and each having opposed side walls parallel to the axis of the broom reel and spaced apart a first distance;

a plurality of broom elements having parallel side walls at a first end thereof spaced apart a distance less than that of the spacing between the opposed side walls of the broom element holder and adapted to fit loosely within the broom element holder when the respective parallel sides are in alignment; and

securing means for loosely interconnecting the broom element with the broom element holder at its first end permitting relative movement of the broom element within the broom element holder.

4,888,846

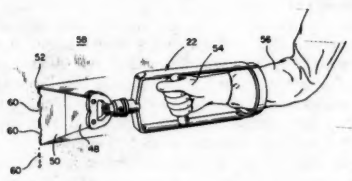
ASBESTOS SCRAPER

Thomas Natale, Moorestown, N.J., assignor to GPAC, Inc., Maple Shade, N.J.

Filed Jan. 5, 1988, Ser. No. 144,520

Int. Cl.[4] A47L *13/022, 13/08*

U.S. Cl. 15—236.01 **20 Claims**



1. A scraper assembly comprising:

a scraper blade for scraping a surface, said scraper blade including a first portion and a second portion,

a support bracket extending longitudinally in a plane, said support bracket having two ends,

means for mounting said first portion of said scraper blade on one end of said support bracket, said first portion extending in said plane of said support bracket, said second portion extending at an angle to said first portion, and

the other end of said support bracket including means for engaging and being supported by the forearm of an operator so that upon forward motion of the arm of the operator at an angle to the surface being scraped, said second portion contacts and scrapes the surface.

4,888,847

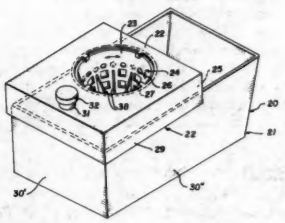
SCRUBBING PAIL DEVICE

Alicia K. Montijo, 1270 B Rabdolph Ave., Grand Forks, AFB, N. Dak. 58205

Filed Apr. 20, 1988, Ser. No. 183,725

Int. Cl.[4] A47J *13/142*

U.S. Cl. 15—263 **3 Claims**



1. A scrubbing pail device comprising a pail, a fluid tight compartment detachably mounted to the top of the pail, a receptacle horizontally beside the compartment at the top of the pail and attached to the compartment for receiving a mop from the top of the receptacle, capped spout means in the top of the compartment serving as a closable opening for filling and replenishing fluid in said compartment with said compartment detachable from said pail for said replenishing of fluid in said compartment, said receptacle having its bottom below said compartment with passage means from the bottom of the compartment to said receptacle to provide a gravity flow of fluid from said compartment to said receptacle, valve means including a first valve means in said passage means to release fluid in said compartment through said passage means into said receptacle under a gravity flow for moistening a mop in said receptacle, said valve means including a second valve means in the bottom of said receptacle to release fluid from said receptacle into said pail.

4,888,848

SYSTEM FOR TREATING FABRICS IN CORD IN CLOSED RING

Jose M. Serracant-Clermont, V.Gracia, 52, and Juan Serracant-Clermont, A.Concordia, 25, both of Sabadell, Spain

Filed Oct. 20, 1988, Ser. No. 260,564

Claims priority, application Spain, Oct. 22, 1987, 8703023

Int. Cl.[4] D06B *15/04*

U.S. Cl. 15—306 A **15 Claims**

1. Apparatus for treatment of fabrics in rope form circulated in a closed ring through the apparatus comprising:

a first device comprising,

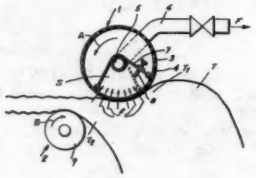
a driven, hollow, cylindrical roller rotatably mounted on a substantially horizontal axis,

a perforated outer wall on said roller,

suction means operatively connected with said roller for drawing air from outside said roller through the perforations therein into the hollow interior thereof, and

restricting means in the hollow interior of said roller for restricting the area of said outer perforated wall connected to said suction means to a working suction area on a lower portion of said roller; and

a positively driven second device mounted in a position relative to said first device for engagement with at least part of the outer surface of the fabric and for feeding the fabric to said working suction area of said first device so that a part of the fabric passing between said first and second devices engages in direct contact said working



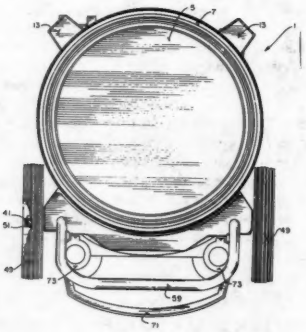
suction area of said roller and said suction draws said part of the fabric in direct contact with said working suction area transversely with respect to the direction of feed of the fabric, the remainder of the fabric falling by its own weight away from said first device thereby opening the fabric by increasing the cross-section of the fabric in at least said transverse direction.

4,888,849

WHEELED HAND CART FOR WET/DRY UTILITY VACUUM CLEANER

David R. Hult, and Jeffrey L. Young, both of St. Peters, Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Sep. 12, 1988, Ser. No. 242,866
Int. Cl.[4] A47L 9/00
U.S. Cl. 15—327 F **17 Claims**



14. In a wet/dry utility vacuum cleaner having a hollow drum for collecting debris, the improvement comprising a wheeled hand cart mounted to said hollow drum for moving and re-positioning same, said wheeled hand cart including:

a pair of spaced wheel frames mounted to said drum about a lower outer periphery thereof, said wheel frames further each having a horizontally extending passageway and a vertically extending channel that intersects and extends across each horizontally extending passageway, said wheel frames being mounted to said drum to permit the horizontally extending passageways of each wheel frame to be in alignment with one another;

an upright handle section positioned within the vertically extending channel of each wheel frame and having a transverse opening therein for alignment with the horizontally extending passageway of each wheel frame, said upright handle sections being interconnected to one another;

a wheel axle extending through the horizontally extending passageways of both caster wheel frames including through the transverse openings in said upright handle sections; and

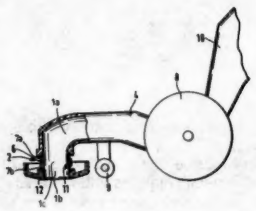
wheels mounted on opposite ends of said wheel axle for wheeled movement of said hand cart.

4,888,850

VACUUM CLEANER NOZZLE ARRANGEMENT

Ludger Helmes, Velbert, and Paul Lienenlüke, Sprockhövel, both of Fed. Rep. of Germany, assignors to Vorwerk & Co. Interholding GmbH, Wuppertal, Fed. Rep. of Germany

Filed May 29, 1987, Ser. No. 55,552
Claims priority, application Fed. Rep. of Germany, Jun. 4, 1986, 3618803
Int. Cl.[4] A47L 9/02
U.S. Cl. 15—359 **2 Claims**



1. A vacuum cleaner nozzle arrangement for a vacuum cleaner, the nozzle arrangement comprising:

a support movable over the surface to be cleaned;

a rigid conduit member mounted on said support and defining a first suction channel;

a rigid nozzle member;

connecting means for connecting said nozzle member to said rigid conduit member;

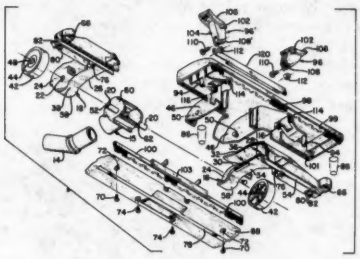
said nozzle member having an end face for contact engaging said surface during the cleaning thereof in response to which a reaction force (R) is developed opposing the movement over the surface, said nozzle member defining a second suction channel terminating in said end face in which a partial vacuum causes a downward force (F) to act upon said nozzle member thereby increasing said reaction force (R); and,

said connecting means including: a rigid conduit segment interposed between said nozzle member and said conduit member, said conduit segment having first and second longitudinal ends and defining a third suction channel communicating with said first and second suction channels; first hinge means connecting said first longitudinal end to said conduit member so as to permit hinged movement of said conduit segment relative to said conduit member and second hinge means connecting said second longitudinal end to said nozzle member so as to permit hinged movement of said conduit segment relative to said nozzle member; said first and second hinge means and said conduit segment conjointly defining translation means for permitting said nozzle member to undergo a translatory displacement away from the surface to be cleaned in response to said reaction force (R) thereby reducing said partial vacuum and decreasing said downward force (F).

4,888,851
BRUSH MOUNTING ARRANGEMENT

Darwin S. Crouser, North Canton, and Vincent L. Weber, North Lawrence, both of Ohio, assignors to The Hoover Company, North Canton, Ohio

Filed Jan. 23, 1989, Ser. No. 299,395
Claims priority, application France, Feb. 3, 1988, 88 01238; United Kingdom, Feb. 3, 1988, 8802361
Int. Cl.[4] A47L 9/06
U.S. Cl. 15—371 7 Claims

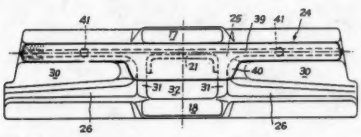


1. A floor care appliance having a wand, and including;
(a) means forming a nozzle for said floor care appliance,
(b) means mounting an agitator in said floor care appliance,
(c) said means mounting an agitator being disposed substantially surrounding said means forming a nozzle, and
(d) said means mounting an agitator and said means forming a nozzle are each adapted to be pivoted to said wand to move relative to each other.

4,888,852
VACUUM CLEANER SUCTION HEAD FOR PICKING UP THREADS

Michel Varin, Crepy-en Valois, France, assignor to Etablissements Georges Olivier S.A., Paris, France

Filed May 27, 1987, Ser. No. 54,589
Claims priority, application France, May 30, 1986, 86 07812
Int. Cl.[4] A47L 9/06
U.S. Cl. 15—400 10 Claims

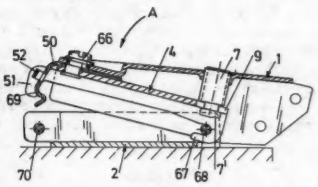


1. A suction head for a vacuum cleaner comprising:
a housing provided with a suction tube and closed by a bottom sole plate having at least two longitudinal suction channels formed as grooves therein and communicating with the suction tube via at least two openings;
means for picking up fibrous substances including a thread-pickup cloth having oriented fibers;
and at least one blade carrying said thread-pickup cloth;
wherein when said means is in a utilization position, the suction head is used as a vacuum thread-pickup member, and said means is received in at least one of said suction channels selected in said sole plate and at least partially obstructs the corresponding opening, and said blade is positioned so that the fibers of said thread-pickup cloth are oriented towards one of the openings and the tips of the fibers in their rest position are substantially level with the sliding surface of said sole plate.

4,888,853
FURNITURE HINGE INCLUDING HINGE ARM RELEASABLY CONNECTED TO MOUNTING PLATE

Erich Röck, Höchst; Helmut Rupprechter, and Klaus Brüstle, both of Lauterach, all of Austria, assignors to Julius Blum Gesellschaft M.B.H., Höchst, Austria

Division of Ser. No. 878,868, May 28, 1986, Pat. No. 4,800,622.
This application Sep. 19, 1988, Ser. No. 246,073
Claims priority, application Austria, Oct. 19, 1984, 3336/84; Oct. 19, 1984, 3337/84; May 9, 1985, 1393/85; Aug. 19, 1985, 2404/85
Int. Cl.[4] E05D 7/06
U.S. Cl. 16—240 10 Claims

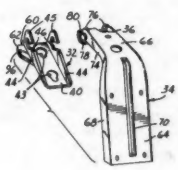


1. A hinge comprising:
a mounting plate having at a first end thereof means defining a pivot axis and having at a second end thereof latching means;
a hinge arm;
an intermediate member adjustably supporting said hinge arm, said intermediate member having at a first end thereof projections engaging said pivot axis such that said intermediate member and said hinge arm are pivotable about said pivot axis with respect to said mounting plate; and
leaf spring means at a second end of said intermediate member for, when said hinge arm and said intermediate member are pivoted about said pivot axis toward said mounting plate, resiliently engaging said latching means.

4,888,854
FOLDING SEAT HINGE ASSEMBLY WITH QUICK DISCONNECT

Ronald W. Russell, Utica, and Larry R. Cox, Brownstown, both of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Apr. 17, 1989, Ser. No. 339,537
Int. Cl.[4] E05D 7/10
U.S. Cl. 16—266 7 Claims



1. A separable seat hinge assembly for supporting a seat member in a vehicle body for movement about a hinge pivot axis, said separable hinge assembly comprising:
a seat-half plate secured to the seat member, said seat half-plate having a pair of parallel spaced ears supporting a pintle pin therebetween;
a body-half plate secured to the vehicle body having a pair of parallel webs, each said web provided with pintle pin follower slot means formed in mirror image relation, said pintle pin being received in each said slot means such that

it is aligned on the hinge axis, said body-half plate formed with a pair of laterally extending mirror image wing portions providing a pair of camming surfaces;

said seat-half plate ears formed with mirror image first and second sets of arcuately spaced cam shoulders with each said first and second set of cam shoulders extending in opposite directions parallel to the hinge axis;

whereby with said seat member in its seating mode each said first set of cam shoulders disposed in frictional engagement with their associated camming surfaces, and whereby with said seat member pivoted on said pintle pin about said hinge axis to its folded mode said second set of cam shoulders disposed in frictional engagement with their associated camming surfaces; and

whereby upon said seat cushion being pivoted about the hinge axis from either its seating mode or its folded mode to a predetermined intermediate detachable mode such that both said first and second sets of cam shoulders being in spaced relationship to their associated camming surfaces enabling said seat-half hinge plate pintle pin to exit said slot means and the seat member to be lifted off its associated body-half hinge plate.

4,888,855

GONDOLA FOR THE TRANSPORT OF ANIMALS TO BE SLAUGHTERED, PREFERABLY HOGS, IN AN ANAESTHESIA SYSTEM

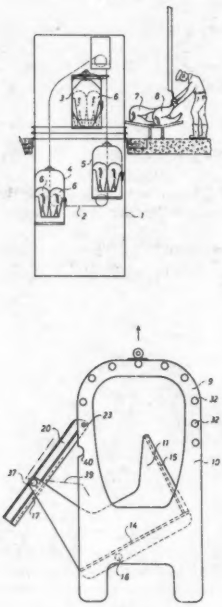
Klaus Haumann, Gentofte, and Ejvind Kildegaard, Holbaek, both of Denmark, assignors to Butina I/S, Holbaek, Denmark

Filed Feb. 10, 1988, Ser. No. 154,954

Claims priority, application Denmark, Feb. 10, 1987, 0675/87

Int. Cl.[4] A22B *3/00*; B61D *9/14*

U.S. Cl. 17—1 A **3 Claims**



1. A gondola for the transport of animals to be slaughtered in an anaesthesia system, said gondola (9) comprising two end gables (10), two side walls (15, 17), and a bottom (14), wherein the bottom (14) and a first side wall (17) are each pivotably mounted around respective axes, said first side wall (17) being pivotably mounted around an axis extending substantially parallel to the bottom (14) and to the rotational axis of the bottom (14) between the two end gables (10) and being spaced from the bottom (14), said first side wall (17) having at least one elongated fixed guide track (20), which track (20) is engaged by a pulley (35, 36), said pulley (35, 36) being pivotably mounted relative to said bottom (14) so that the rotation of either the bottom (14) or the first side wall (17) causes an automatic rotation of the first side wall (17) or the bottom (14) respectively, means (33, 34, 37, 38) for engaging a permanently fixed guide means for rotating the bottom and the first side wall around their respective rotational axes from a starting position, in which the gondola is adapted to receive animals to be slaughtered, to a discharging position in which an intermediate slide gap for the animals is provided.

4,888,856

TREATMENT OF COTTON

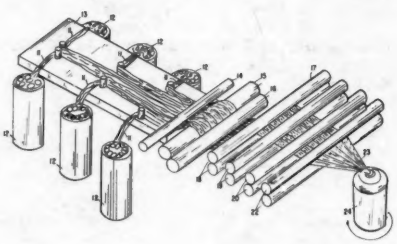
Herzel B. Yescheskel, Bat Yam; Gad Alon, Herzlia, and Eliezer Beck, Rishon Lezion, all of Israel, assignors to The Shenkar College of Textile Technology and Fashion, Ramat Gan, Israel

Division of Ser. No. 833,987, Feb. 26, 1986, Pat. No. 4,796,334. This application Dec. 10, 1987, Ser. No. 132,790

Claims priority, application Israel, Feb. 28, 1985, 74469

Int. Cl.[4] D01B *1/48*

U.S. Cl. 19—0.27 **22 Claims**



1. A method of processing cotton, comprising the steps of:

exposing the cotton to a heat source having a predeterminate temperature;

during said step of exposing the cotton to said heat source having said predeterminate temperature, heating the cotton to a preselected maximum temperature;

said step of heating the cotton to said preselected maximum temperature, entailing the step of exposing the cotton to said heat source having said predeterminate temperature, for a predetermined period of time sufficient for heating the cotton to said preselected maximum temperature and thereby transforming honeydew, which is adhered to the cotton, to a hard and brittly, readily removable material; and

carrying out said exposing and heating operations in combination with selective ones of conventional seed cotton and cotton processing operations.

4,888,857

APPARATUS FOR REMOVING FIBER MATERIAL ACCUMULATIONS, IN PARTICULAR FROM BALES OF SPINNING MATERIAL

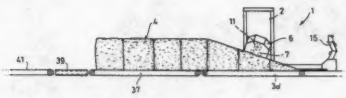
Akiva Pinto, Duesseldorf; Guenter Lucassen, Haltern, and Reinhard Schmidt, Gescher, all of Fed. Rep. of Germany, assignors to Hergeth Hollingsworth GmbH, Duelmen, Fed. Rep. of Germany

Filed Sep. 6, 1988, Ser. No. 240,980

Claims priority, application Fed. Rep. of Germany, Sep. 11, 1987, 3730487

Int. Cl.[4] D01G *7/06*

U.S. Cl. 19—80 R 10 Claims



1. Apparatus for removing textile fiber material from bales of spinning material and the like of the type having a tower which reciprocates with a carriage on guide rails along the fiber material, said tower comprising at least one cantilevered arm extending transversely to the travel direction and including a milling means for removing fiber material, said cantilevered arm and said milling means being displaceable along a height of said tower and the removed fiber material is discharged by a suction air current, characterized in that said apparatus includes support means for rotatably carrying said cantilevered arm and said milling means on said tower and adjusting the angular position of said cantilevered arm with respect to said tower so that said cantilevered arm and milling means are adjustable to various angles relative to a longitudinal axis of said tower.

4,888,858

BUCKLE ASSEMBLY

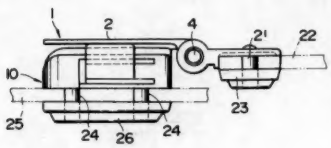
Kazumi Kasai, Namerikawa, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

Filed Jun. 14, 1989, Ser. No. 365,685

Claims priority, application Japan, Jun. 17, 1988, 63-80433[U]

Int. Cl.[4] A44B *11/14*

U.S. Cl. 24—163 R 2 Claims



1. A buckle comprising: a male member having a tongue-shaped presser having on its bottom side a pair of engaging legs each having on its inner side a stepped portion; a female member in the form of a case having in its top wall a central aperture for insertion of the engaging legs thereinto, the female member having a pair of resilient arms, one mounted on each side thereof, each resilient arm extending from one end of the female member and terminating in a free end portion for resilient angular movement about its proximal end, each free end portion having on its inner side a hook-shaped engaging means adapted for engagement with the stepped portion of the corresponding engaging leg when the engaging legs are inserted into the central aperture; and the tongue-shaped presser further having on its bottom side a pair of resilient pieces, the free end portions further having on their respective inner sides abutment portions adapted to compress the distal portions of the resilient pieces against the resiliency thereof as the resilient arms are angularly moved in the direction to bring the hook-shaped engaging means out of engagement with the stepped portions of the engaging legs.

4,888,859

WATER-TIGHT SLIDE FASTENER

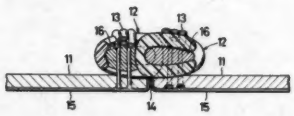
Yoshiyuki Horita, Toyama, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

Filed Aug. 11, 1988, Ser. No. 231,346

Claims priority, application Japan, Aug. 12, 1987, 62-202257

Int. Cl.[4] A44B *19/32*

U.S. Cl. 24—389 5 Claims



1. A water-tight slide fastener which comprises a pair of oppositely disposed support tapes, a row of fastener coupling elements, each having a coupling head, and an upper leg portion, a lower leg portion and a heel portion and secured by sewing threads to and along an inner longitudinal edge of each of the respective support tapes, and a filling core extending through spaces defined in said row of coupling elements and initially filling said spaces except for the region of said coupling head, said core having means rendering it capable of swelling upon contact with a liquid and completely filling up said spaces against entry of the liquid into the interior of an article to which the fastener is applied, and said support tape being coated with a water-resistant coating material on one of its surfaces and on its longitudinal marginal edge.

4,888,860

APPARATUS AND METHOD FOR SHRINK TREATING A TEXTILE FABRIC WEB

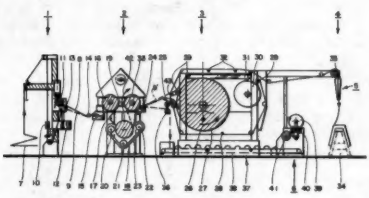
Heinz Metzen, Moenchengladbach, Fed. Rep. of Germany, assignor to A. Monforts GmbH & Co., Fed. Rep. of Germany

Filed Oct. 6, 1988, Ser. No. 254,496

Claims priority, application Fed. Rep. of Germany, Oct. 10, 1987, 3734333

Int. Cl.[4] D06C *21/00*

U.S. Cl. 26—18.6 11 Claims



1. An apparatus for shrink treating a traveling textile fabric web of either woven or knitted construction, comprising a fabric elevating device for downward fabric intake, a main fabric spreading device, a fabric wetting device, an auxiliary fabric spreading device, a fabric steaming device for lightly moistening a traveling fabric web, and a fabric shrinking unit arranged in sequence with one another, a relatively small diameter fabric drying cylinder and a relatively large diameter fabric calendering device arranged for alternate fabric drying operation sequentially following said fabric shrinking unit, a device for transporting fabric in relaxed condition sequentially following said drying cylinder, a fabric winding mechanism

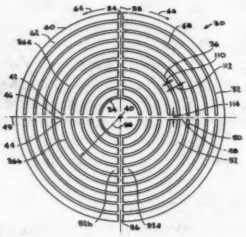
arranged sequentially following said fabric transporting device, a fabric cuttling mechanism arranged sequentially following said calendering device, and means for selectively guiding a woven fabric web to travel for shrink treatment sequentially to said fabric elevating device, said main spreading device, said wetting device, said steaming device, said shrinking unit, said calendering device and said cuttling mechanism and for selectively guiding a knitted fabric web to travel for shrink treatment sequentially to said fabric elevating device, said main spreading device, said auxiliary spreading device, said steaming device, said shrinking unit, said drying cylinder, said fabric transporting device, and said winding mechanism, said wetting device and said steaming device being cooperatively adjustable for selectively wetting a woven fabric web to a desired moisture content.

4,888,861

ANNULAR ARRAY AND METHOD OF MANUFACTURING SAME

Robert A. Day, Livermore, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 10, 1985, Ser. No. 786,384
Int. Cl.[4] H01L *41/22, 41/04*
U.S. Cl. 29—25.35 **10 Claims**



1. A method for forming an annular acoustic transducer array from a largely plate-shaped workpiece of acoustic transducer material, and mounting the array on a supporting surface comprising:

forming a plurality of sets of concentric annular cuts in and completely through said workpiece, each set of annular cuts including at least a pair of cuts formed so as to extend by less than 360° and having a pair of cut ends, said plurality of sets of cuts each being of different radii and radially spaced from one another to leave annular lands between cuts of different radii;

said step of forming including extending each of said pair of cuts of a set toward but short of each other to form said cut ends which are spaced apart to leave a bridge between them, whereby to hold the lands concentric until they can be mounted on a supporting surface.

4,888,862

METHOD FOR INSTALLING BEARING RINGS

Manfred Brandenstein, Eussenheim, and Herrmann Hetterich, Heidenfeld, both of Fed. Rep. of Germany, assignors to SKF GmbH, Fed. Rep. of Germany

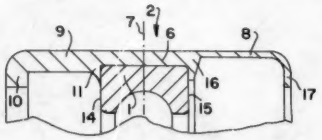
Filed Dec. 4, 1987, Ser. No. 128,733
Claims priority, application Fed. Rep. of Germany, Dec. 10, 1986, 3642115
Int. Cl.[4] B21K *1/02*
U.S. Cl. 29—148.4 A **2 Claims**

1. Method for assembling bearing rings having opposing axial end faces in an elongated sleeve member consisting of the steps of

(a) forming a roller shell with three sections of varying wall thicknesses separated by annular circumferentially extending shoulders,

(b) deforming the shoulder between the middle section and one end section to form a ring-shaped radially, inwardly directed projection by axial displacement of the shoulder,

(c) inserting a bearing ring in the interior of the shell membmer so that one axial end face engages the first radially oriented projection formed,



(d) deforming the shoulder between the middle section and the opposite end section to form a second radially inwardly directed projection by axial displacement of the shoulder which confronts the other axial end face of the bearing ring, and

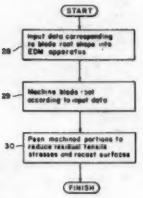
(e) flanging over the edge of the roller shell in the area of the end section of greater wall thickness to form a ring-shaped, radial flange during prefabrication of the roller shell.

4,888,863

METHOD AND APPARATUS FOR PRODUCING TURBINE BLADE ROOTS

Jimmy A. Cox, Clemmons, N.C., and Ian L. Wilson, Murrysville, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 21, 1988, Ser. No. 171,081
Int. Cl.[4] B21K *3/04*
U.S. Cl. 29—156.8 B **8 Claims**


START
28
Input data corresponding to blade root shape into EDM apparatus
29
Machine blade root according to input data
30
Peen machined portions to reduce residual tensile stresses and recast surfaces
FINISH

1. A method for producing turbine blade roots, comprising the steps of:

(a) inputting data corresponding to a plurality of desired blade root shapes into an electro-discharge machining apparatus, storing the input data and selecting a desired blade root shape from the stored input data to be used to machine a blank turbine blade root;

(b) electro-discharge machining the blank turbine blade root into the desired blade root shaped; and

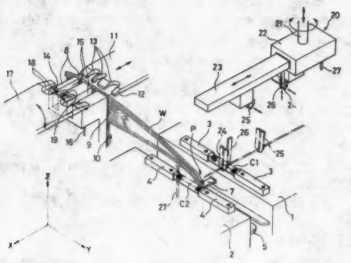
(c) peening the machined portion of the machined blade root at an intensity of from 4 almen to 6 almen to reduce surface recast and residual tensile stresses.

4,888,864

APPARATUS FOR MOUNTING CABLE ON A CONNECTOR

Takashi Masaki, Tokyo, Japan, assignor to Hirose Electric Co., Ltd., Tokyo, Japan

Filed May 26, 1989, Ser. No. 357,129
Claims priority, application Japan, Aug. 17, 1988, 63-203159
Int. Cl.[4] H01R *43/04*
U.S. Cl. 29—753 2 Claims



1. Apparatus for mounting a plurality of conductors of a multiconductor cable on a plurality of contacts or connection grooves of a connector, which comprises:

a connector holder for holding said connector such that said contacts or connection grooves are exposed;

a cable holder provided so as to hold said multiconductor cable adjacent said connector;

receiver means provided behind said connector holder, said receiver means including:

a receiver slit extending along a longitudinal axis of said connector and downwardly from a top surface of said receiver means and having a width substantially equal to a conductor diameter for receiving said conductors aligned side by side in a vertical plane along said longitudinal axis; and

biasing means provided at a bottom of said receiver slit for biasing upwardly said aligned conductors;

transfer means provided on said receiver means for reciprocating movement in a direction perpendicular to said vertical plane and having a transfer groove extending parallel to said vertical plane for moving a single top conductor from said receiving slit;

a receiving groove provided on said top surface extending parallel to said vertical plane for receiving a conductor when said transfer means is moved to an advanced position;

a sensor provided on said receiver means such that it contacts a wire of said conductor held in said receiving groove to generate a conductor identification signal;

a pair of escapement slots extending in a direction perpendicular to said vertical plane and downwardly from said top surface by a distance greater than said conductor diameter;

clamp means with clearance recesses for receiving a front end of said transfer means to hold said conductor in said receiving groove when said transfer means is moved to said advanced position;

carrier means with a frame rotatable about a vertical axis and movable in each direction of a rectangular coordinate system and having an arm for reciprocating movement in a direction perpendicular to said vertical plane;

two pairs of fingers, one provided on said frame and the other provided on said arm, each pair being able to enter each escapement slot to hold said conductor between said fingers when said clamp means holds said conductor, and said transfer means is moved to a retreated position;

pusher means provided on said carrier means adjacent one of said finger pairs for reciprocating movement along said vertical axis to push said conductor into said contact or connection groove of said connector; and

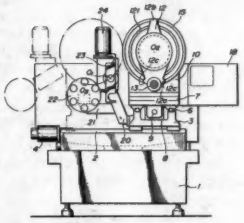
control means in response to said conductor identification signal to move said fingers so that said conductor is placed above a desired contact or connection groove and inserted thereunto by said pusher means to thereby mount said conductor on said connector.

4,888,865

MACHINE TOOL

Eiichi Okada; Akira Ozawa; Tomomi Kousaka, all of Saitama, and Hirokazu Ohba, Shizuoka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 16, 1988, Ser. No. 168,945
Claims priority, application Japan, Mar. 16, 1987, 62-60584; Apr. 6, 1987, 62-84303
Int. Cl.[4] B23C *1/027*; B23Q *3/157*
U.S. Cl. 29—568 7 Claims



1. A machine tool comprising:

a first movable base movable in a horizontal plane in a first direction;

a second movable base mounted on said first movable base and movable toward and away from a workpiece in the horizontal plane in a second direction transverse to said first direction;

a support base mounted on said second movable base,

a spindle stock supported on said support base and rotatable about a center in a vertical plane; and

a spindle device mounted on an outer end of said spindle stock at a position off said center;

said support base including an annular support member disposed on a front surface thereof coaxially with said center;

said spindle stock having a slidable member held in slidable contact with said annular support member; and

said spindle stock comprises an arm including a rear surface said slidable member being disposed on at least said rear surface of said arm on each side of said spindle device.

4,888,866

METHOD OF OPTIMIZING ARMATURE BALANCE THROUGH LAMINATION ORIENTATION

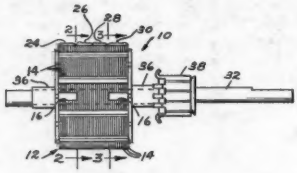
Kent G. Hansen, London, Canada, assignor to Magna International (Canada) Inc., Markham, Canada

Division of Ser. No. 118,038, Nov. 9, 1987, Pat. No. 4,833,353.
This application Sep. 28, 1988, Ser. No. 250,090
Int. Cl.[4] H02K *15/02*
U.S. Cl. 29—598 5 Claims

1. A method of making an electrical flux conducting rotor having an axis of rotation with a stack of sheet metal blanks extending perpendicularly to the axis of rotation in which each blank of the stack has an outline shape of a symmetry capable of enabling each blank to be stacked in outline alignment with any other blank of the stack when displaced in such stacked relation angularly about the axis of rotation of the rotor a plurality of equal angular divisions of 360°, said method comprising the steps of

utilizing as blanks to form the stack one group or a plurality of groups of blanks each of which has a predetermined orientation based upon being similarly blanked from the same metal sheet,

arranging the blanks of each group in a plurality of successive blank sections of an even number numbering at least four while insuring that each blank section contains a number of blanks equal to the number of blanks in each blank section of the associated group and the blanks of the blank sections of each group are displaced angularly with



respect to the predetermined orientation relative to one another so as to statically and dynamically balance the orientation of the blanks of the blank sections of each group about the axis of rotation of each rotor, and the predetermined orientation being one in which the relative angular displacement of the blanks of the blank sections of a first half of the group is the same but in a mirror-image relationship with respect to the relative angular displacement of the blanks of the blank sections of a second half of the group.

laminating together the stack of blanks so arranged.

4,888,867

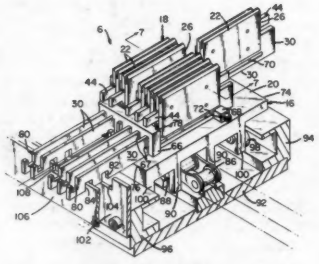
METHOD OF MANUFACTURING ELECTRICAL HARNESSES

Werner Maack, Seeheim; Michael Gerst, Worms, and Manfred Liedloff, Dieburg, all of Fed. Rep. of Germany, assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 551,621, Nov. 14, 1983, Pat. No. 4,559,702. This application Nov. 5, 1985, Ser. No. 795,281

Int. Cl.[4] H01R *43/00*

U.S. Cl. 29—857 **7 Claims**



1. A method of manufacturing an electrical harness of the type comprising a plurality of discrete wires, each wire having a first end and a second end, the first ends having first terminals thereon, at least some of the first terminals being discrete terminals, the method comprising the steps of:

feeding the discrete wires from substantially endless sources to extend through, and beyond, a first loading zone in such a way that the wires are in side-by-side coplanar parallel relationship in a first array in the first loading zone,

clamping the first array of wires in the first loading zone after cessation of the feeding step and cutting the wires at a location adjacent to and upstream, relative to the direction of wire feed, from the first loading zone thereby producing the first and second wire ends, the first ends being the cut ends of the first array,

intermittently moving the first array of wires laterally of the axes of the wires along a first conveying path past a succession of first individual wire processing machines such as terminal crimping machines, and pausing at each of the individual processing machines,

moving at least one selected wire axially from the array towards the individual wire processing machine at which said array of wires is paused and performing an operation on the at least one wires such as crimping a terminal onto the at least one wire.

4,888,868

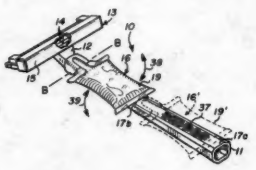
DISPOSABLE RAZOR ASSEMBLY WITH DETACHABLE PACKET CONTAINING SHAVING-ASSOCIATED MATERIAL

Kevin M. Pritchard, 15141 Becky La., Monte Sereno, Calif. 95030

Filed Jan. 21, 1988, Ser. No. 146,732

Int. Cl.[4] B26B *21/44*

U.S. Cl. 30—41 **11 Claims**



1. A razor assembly particularly adapted for use in highly humid environments, comprising:

(a) means defining a shaving head,

(b) a handle having a first portion carrying said shaving head suitable to permit said head to be used as a manually operated razor, and a second portion elongated as to provide sufficient area to be grasped by the user's hand, said second portion being provided with one or more broad surfaces,

(c) a packet assembly adapted to be releasably connected to said one or more broad surfaces of said second portion piggyback style, said packet including a rupturable sealed reservoir containing normally confined, single-use shaving-associated material; said packet assembly being disposed releasably connected to said handle so that release of said packet from said handle substantially simultaneously ruptures said reservoir irrespective of high humidity at the release site.

4,888,869

LOCK-BAR FOLDABLE TOOL

Timothy S. Leatherman, Portland, Oreg., assignor to Leatherman Tool Group, Inc., Portland, Oreg.

Continuation-in-part of Ser. No. 853,349, Apr. 17, 1986, Pat. No. 4,744,272. This application May 16, 1988, Ser. No. 194,394

Int. Cl.[4] B26B *1/04*

U.S. Cl. 30—161 **14 Claims**

1. A foldable tool comprising:

(a) an elongate handle having a length greater than its width and its depth;

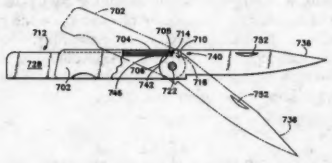
(b) at least one tool blade pivotally connected to said handle and pivotable thereto between extended and retracted positions, said tool blade having a base approximate said handle;

(c) said handle including spring means resiliently bearing

against said base for deflecting to permit said tool blade to be pivoted between said extended and retracted positions;

(d) operable locking means for selectively preventing said spring means from deflecting; and

(e) said locking means including an elongate channel having



a length greater than its width and its depth pivoted to said handle to receive a portion of said handle in said channel when in a nested, locked position so that said length of said channel extends along said length of said handle so as to form therewith handle means for grasping said tool.

4,888,870

HAIR TRIMMER

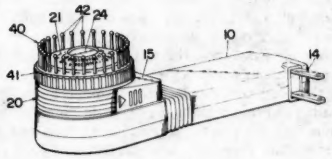
Shouji Fujikawa, Ishibe; Masakatsu Araki; Fumihiro Kumano, both of Hikone, and Shinichirou Tsujimura, Nagahama, all of Japan, assignors to Matsushita Electric Works, Ltd., Japan

Filed Jul. 28, 1988, Ser. No. 226,313

Claims priority, application Japan, Aug. 13, 1987, 62-202060; Dec. 15, 1987, 62-316671

Int. Cl.[4] B26B *19/00, 13/00*

U.S. Cl. 30—233.5 **20 Claims**



1. A hair trimmer comprising:

a handle grip;

a cutting head mounted on said handle grip and including an outer shearing foil with a plurality of perforations and an inner cutter assembly driven to move in hair shearing engagement with the undersurface of said outer shearing foil;

said cutting head being formed on its top with a hair guide surface for guiding thereover hair strands;

said outer shearing foil having said perforations in a portion which is located below said hair guide surface in an inclined relation with respect thereto;

said cutting head including a skin engaging comb which projects above said hair guide surface for combing the hair strands therepast as the cutting head is moved across the head skin of the user, whereby the hair strands after passing said hair guide surface are caused to flex toward the inclined portion of the outer shearing foil behind said hair guide surface with respect to the advancing direction of the cutting head such that only the tips of the hair strands are allowed to be fed due to the above flexing into the perforations of that inclined portion of the outer shearing foil and sheared thereat.

4,888,871

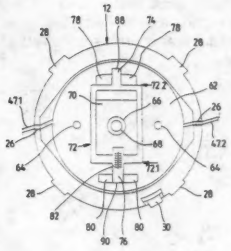
DRIVING HEAD FOR LINE CUTTING DEVICES

Fillippus T. Engelbrecht, Potchefstroom, South Africa, assignor to Centiforce (Proprietary) Limited, South Africa

Filed Jan. 11, 1989, Ser. No. 295,669

Int. Cl.[4] B26B *7/00;* **A01D** *35/00*

U.S. Cl. 30—276 **3 Claims**



1. A driving head for a line cutter device, which head includes

(a) a base part;

(b) a spool driver, the spool driver being rotatably mounted relative to the base part;

(c) mounting means for mounting a spool, on which a cutting line is wound, on the spool driver;

(d) a set of teeth circumferentially distributed on the spool driver;

(e) an operating member connected to the base part and having oppositely a first end and a second end and a first detent at the first end and a second detent at the second end, the detents being adapted for cooperating selectively with one of the teeth of the set of teeth on the spool driver, the first end being heavier than the second end;

(f) biasing means for biasing the operating member in a direction in which the second detent cooperates with one of the teeth of the set of teeth and the first detent being out of cooperation with the teeth of the set of teeth, the biasing means being such that when the operating member is rotated faster than a predetermined rotational speed the centrifugal force of the operating member acting on the biasing means causes it to be counteracted to disengage the second detent from the tooth with which it is engaged thereby allowing slippage between the operating member and the spool driver so that an increment of line is fed out from a spool mounted in the driving head and bringing the first detent into cooperation with a tooth of the set of teeth;

(g) connection means for drivingly connecting the base member to a rotating power source; and

(h) guide means in the base part for guiding cutting line from a spool mounted on the spool driver.

4,888,872

CHAIN SAW ATTACHMENT

Thomas Eistrat, 1020 S. Almansor St., Alhambra, Calif. 91801

Filed Sep. 14, 1988, Ser. No. 244,507

Int. Cl.[4] B23B *21/08*

U.S. Cl. 30—371 **9 Claims**

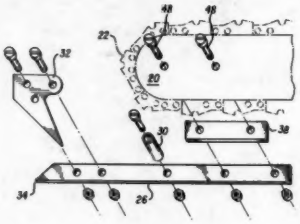
1. An attachment for a portion of the tip on a chain saw bar comprising:

a generally projecting forwardly adequate guide structural means from the tip of a chain saw bar on at least one side of the chain saw bar for enabling a workpiece, such as wood or other material, to be engaged over or below the workpiece or wood by the guide structural means and the guide structural means provides a safe steady support to

the chain saw bar tip by the outward end of the guide structural means first contacting wood to be cut, and then both during the sliding of the guide structural means over or under the wood to be cut, and then while the guide structural means is holding the wood during cutting with the chain at the tip of the chain saw bar,

attaching means for attaching the guide structural means sufficiently clear of the chain on the chain saw bar to securely fasten the guide structural means to the chain saw bar arm on adequate spacer means,

the guide structural means is attached to an adequate vibration absorbing spacer means that is attached between the



chain saw bar and the guide structural means with adequate adjustable fastener means so that the fastening means can be tensioned to an appropriate dampening of vibration and security of fastening aforesaid attachment to the chain saw bar when a chain on the chain saw bar tip is cutting a workpiece,

the guide structural means is a structure of appropriate material and cross-sectional shape with holes in the structure if desired and suitably spaced for attachment of a chain catcher means and a hook pulling means and or point pushing means, and if desired at least one attachable hook pulling means.

4,888,873

NAVIGATION APPARATUS

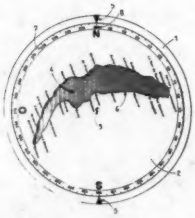
Claude Mozer, Chemin des Clochettes 16, 1206 Geneve - Canton of Geneva, Switzerland

Filed Aug. 31, 1988, Ser. No. 238,743

Claims priority, application Switzerland, Sep. 8, 1987, 3463/87

Int. Cl.[4] G03B *21/00*

U.S. Cl. 33—1 SD **8 Claims**



1. Navigation apparatus comprising a disc at least a part of which is transparent, said disc being applied on the upper face of a base element on which it is rotatably mounted and one of said elements —said disc and said base element—displaying a geographical map of the area where the navigation has to take place and a circular graduation divided in degrees, the center of which graduation coincides with the center of rotation of the disc and the "0" point of which is situated at the north of said area, and in which the other one of said elements—said base element and said disc—is provided with parallel straight lines and with at least one peripheral index so positioned that a radius extending from the center of rotation of the disc and passing through said index is parallel to the direction of said straight lines, the arrangement being such that, by rotating the disc with respect to the base element to bring points of the geographical map respectively indicating two places thereon so that said points are situated on one and the same line of said parallel lines, the disc is placed in an angular position such that the index indicates, with respect to the circular graduation, the course which a navigator has to follow to travel from one of said two places to the other one thereof.

4,888,874

DRAWING DEVICE HAVING MOBILE STYLUS TRACING LINES ON GLASS PLATE

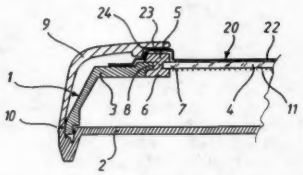
Francis Oster, Strasbourg, France, assignor to Buddy L Corporation, New York, N.Y.

Filed Jul. 14, 1988, Ser. No. 218,980

Claims priority, application France, Apr. 5, 1988, 88 04649

Int. Cl.[4] B43I *13/00*

U.S. Cl. 33—18.1 **3 Claims**



1. A toy tracing device comprising:

A a housing constituted by an upper part and a lower part, the upper part having an opening therein bordered by a frame to define a window, said housing containing a charge of slightly adhesive powder sufficient to form an opaque layer on the undersurface of the plate;

B a glass plate covering the window, the edges of the plate being received within a groove formed in a rim surrounding the plate and joined to the frame, thereby sealing the housing to prevent leakage of powder therefrom; said rim being molded about the glass plate, said groove being intermediate upper and lower sections of the rim;

C a stylus movable within the housing and engaging the undersurface of the glass plate to trace lines in said layer of powder adhering thereto; and

D a transparent protective film made of relatively rigid, heat-formable, synthetic plastic material shielding the outer surface of the plate to prevent injuries should the plate break; said film having a margin extending beyond the plate and formed to conform to the upper section of the rim so that the film fits exactly on the rim, said housing including an outer part which overlies the upper part and has an opening therein bordered by an outer frame which overlies the margin of the film, whereby this margin is trapped between the outer frame and the rim.

4,888,875

LEVEL FOR WEIGHTLIFTING

John M. Strother, 1863 13th St., Apt. #2, Akron, Ohio 44223

Filed Nov. 9, 1987, Ser. No. 118,855

Int. Cl.[4] G01C *9/28*

U.S. Cl. 33—347 **7 Claims**

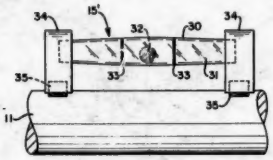
1. A leveling device for use with an exercise device comprising,

tube means containing a liquid and leveling means in said liquid for determining level or pitch;

magnetic means associated with said tube means and ex-

posed so as to secure said leveling device to said exercise device, wherein said magnetic means are shaped so as to correspond to a surface of said exercise device;

means to inhibit rapid movement of said leveling means within said tube means to facilitate the determination of



the level relationship of said exercise device during movement thereof;

said tube means being continuously observable such that the relationship of said exercise device to level may be continuously observed as said exercise device is used during exercise.

4,888,876

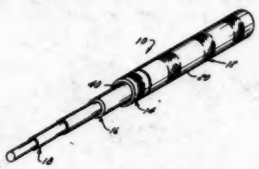
ROLLER CHAIN WEAR GAUGE

Thomas L. Meredith, Elmtree Park Apts. #993, Indianapolis, Ind. 46229, and Robert C. Garrett, 1556 S. 14th St., Milwaukee, Wis. 53204

Filed Nov. 17, 1988, Ser. No. 272,710

Int. Cl.[4] G01B *3/20*

U.S. Cl. 33—501.08 **7 Claims**



1. A collapsible roller chain wear gauge comprising:

a hollow cylindrical handle having an axial bore closed at one end and an internal threaded at the other end;

a cap having a threaded section on one end for matingly engaging the threaded opening in said handle;

a first hollow cylindrical gauge member having an outer diameter smaller than the diameter of said handle;

means for connecting said first gauge member to said cap;

a second cylindrical gauge member having a diameter smaller than the diameter of the bore in said first gauge member; and

means for connecting said second gauge member to said first gauge member whereby said second gauge member can be stored in said first gauge member and said first gauge member can be stored in said handle.

4,888,877

ARTICULATING HEAD FOR A COORDINATE-MEASURING INSTRUMENT

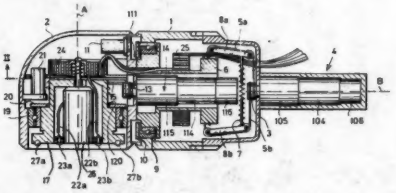
Eckhard Enderle, Aalen; Dieter Kaufmann, Heidenheim; Müller, Gmünd-Grossdeinbach, and Thomas Andrzejewski, Aalen, all of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenhein/Brenz, doing business as Carl Zeiss, Oberkochen, Fed. Rep. of Germany

Filed May 9, 1988, Ser. No. 191,392

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1987, 3740070

Int. Cl.[4] G01B *7/00*

U.S. Cl. 33—559 **18 Claims**



1. As an article of manufacture, a two-axis articulating accessory head adapted for mounting to the probe-supporting arm of an existing coordinate-measuring machine wherein the machine includes multiple-coordinate drives for probe positioning via said arm, and a programmable computer providing data storage and coordinated drive control, said accessory head comprising:

a first housing part having a first axis via which said part is adapted at one end to be removably mounted to an existing probe-supporting arm;

a second housing part mounted for rotation about said first axis adjacent the other end of said first housing part;

first positioning means coacting between said housing parts and providing the sole means of controlling instantaneous angular positioning of said second housing part about said first axis, said first positioning means including (a) first drive means having first means of computer-generated input-signal connection, and (b) angle-encoding means coacting between said housing parts and providing for computer connection of an encoded electric-signal output reflecting instantaneous angular-position data about said first axis;

probe-holder means mounted by said second housing part for rotation about a second axis orthogonal to said first axis; and

second positioning means coacting between said probe-holder means and said second housing part and providing the sole means of controlling instantaneous angular positioning of said probe-holder means about said second axis, said second positioning means including (c) second drive means having second means of computer-generated input-signal connection, and (d) angle-encoding means coacting between said probe-holder means and said second housing part and providing for computer connection of an encoded electric-signal output reflecting instantaneous angular-position data about said second axis.

4,888,878

FINE POSITIONING DEVICE

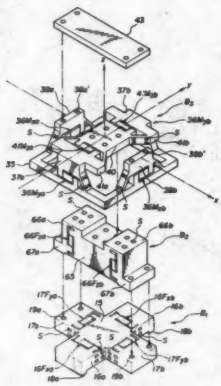
Kiyoshi Nagasawa, Ibaragi; Kozo Ono, Toride; Kojiro Ogata, Ishioka; Ken Murayama, Ibaragi, and Yoshihiro Hoshino, Tsuchiura, all of Japan, assignors to Hitachi Construction Machinery Co., Ltd., Tokyo, Japan

Division of Ser. No. 94,294, Sep. 8, 1987. This application Sep. 14, 1988, Ser. No. 244,168

Claims priority, application Japan, Sep. 9, 1986, 61-210616; Sep. 9, 1986, 61-210618; Sep. 9, 1986, 61-210619; Nov. 4, 1986, 61-262437; Nov. 29, 1986, 61-283061; Nov. 29, 1986, 61-283062; Nov. 29, 1986, 61-283063; Mar. 31, 1987, 62-76269; Mar. 31, 1987, 62-76270

Int. Cl.[4] G01B *5/00*

U.S. Cl. 33—573 6 Claims



1. A fine positioning device comprising:

a first block comprising a central rigid portion, a first set of outwardly-extending portions extending symmetrically along a first axis from the central rigid portion and equipped respectively with first parallel flexible-beam displacement mechanisms to produce in the first set of outwardly-extending portions translational displacements along a second axis which is perpendicular to the first axis, and a second set of outwardly-extending portions extending symmetrically along the second axis from the central rigid portion and equipped respectively with second parallel flexible-beam displacement mechanisms to produce in the second set of outwardly-extending portions translational displacements along the first axis;

a second block comprising a central rigid portion and a set of outwardly-extending portions extending symmetrically along the second axis from the central rigid portion of the second block, said outwardly-extending portions being equipped respectively with parallel flexible-beam displacement mechanisms adapted to produce translational displacement along a third axis, which is perpendicular to both first and second axes, and connected to the second set of outwardly-extending portions respectively; and a third block comprising a rigid ring, a set of first radial flexible-beam displacement mechanisms provided on the rigid ring and adapted to produce angular displacements about the first axis, a set of second radial flexible-beam displacement mechanisms provided on the rigid ring and adapted to produce angular displacements about the second axis, and a set of outwardly-extending portions extending symmetrically from a central rigid portion, which is connected to the central rigid portion of the second block, and equipped respectively with third radial flexible-beam displacement mechanisms for producing angular displacements about the third axis.

4,888,879

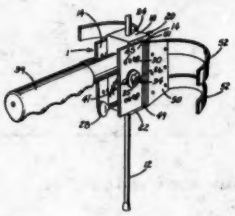
ELECTRICAL JUNCTION BOX INSTALLER

Rodney G. Dixon, Rte. 1, Box 121M, Strafford, Mo. 65757

Filed Mar. 21, 1988, Ser. No. 170,840

Int. Cl.[4] B25B *21/20*

U.S. Cl. 33—613 11 Claims



1. An electrical junction box installer for positioning electrical junction boxes on studs during construction of a wall above a floor; said installer comprising:

(a) a central frame including a stud engaging surface;

(b) vertical positioning means connected to said central frame for positioning and maintaining said central frame at a predetermined distance above the floor; and

(c) junction box support means connected to said central frame for temporary support of an electrical junction box in a fixed position relative to said frame, said support means comprising spring means extending outwardly from said central frame and adapted to compressably fit at least partly within an electrical junction box for exerting outwardly-directed spring force against opposite surfaces within the junction box interior whereby the box is held by the spring means during installation and whereby the spring means can be withdrawn from the box after installation, said spring means having a compressed configuration extending between the junction box interior opposite surfaces.

4,888,880

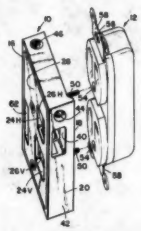
ELECTRICIAN'S LEVEL

Michael A. Parker, 1725 Nueva Vista Dr., Denver, Colo. 80229

Filed Jan. 10, 1989, Ser. No. 295,266

Int. Cl.[4] G01C *9/26*

U.S. Cl. 33—645 9 Claims



1. An electrician's tool which comprises: a rectangular housing having right and left sidewalls lying in spaced parallel relation to one another, top and bottom walls, a front face, a rear face, a stop-forming rib extending along the right sidewall projecting inwardly from the rear face, and a pair of prong-receiving openings located in the rear face spaced apart the distance separating the openings in a first grounded dual receptacle adapted to receive the grounded prongs of a wall plug; and means comprising a pair of prong-forming pins detachably

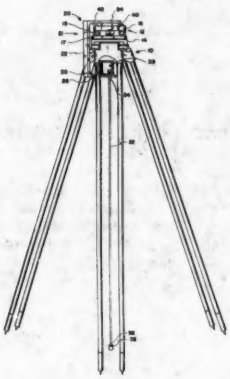
connectable within the prong-receiving openings in the housing for insertion into the grounded prong-receiving openings in the first dual receptacle for holding said housing and receptacle in assembled relation, said pins when thus connected and inserted into the prong-receiving openings of said first dual receptacle cooperating with the rib spaced to the right thereof so as to position a second dual receptacle placed alongside the first and in stop-forming contact with said rib thereby positioning the plug-receiving parts of both dual receptacles in position to register with the openings in a double dual receptacle trimplate.

4,888,881

DIRECT HEIGHT MEASURING DEVICE FOR SURVEYING INSTRUMENTS

Edgar E. Dudley, 5352 First Ave., North, Birmingham, Ala. 35212

Filed Dec. 5, 1988, Ser. No. 279,783
Int. Cl.[4] G01B *3/02*
U.S. Cl. 33—759 **8 Claims**



1. Apparatus for direct measurement of the height of a surveying instrument prior to said surveying instrument being mounted on an instrument engaging support, such as a tribrach carried on a tripod or the like, comprising:

a frame having a central portion provided with upper and lower spaced arms extending in substantially normal relation therefrom;

an adapter secured to said upper arm of said frame and disposed for being removably mounted in said instrument engaging support, said adapter being constructed similarly to the base of the surveying instrument to be mounted on said instrument engaging support for a surveying operation, said frame, and thereby said adapter, disposed for removal from said instrument engaging support responsive to said instrument engaging support being levelled and locked in a levelled position; and

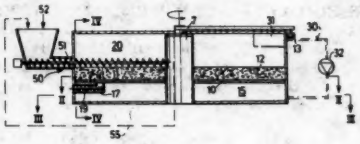
a tape measuring device secured to said lower arm of said frame and having a calibrated tape extending therefrom for measuring the distance to the ground or other supporting surface prior to emplacement of said surveying instrument on said instrument engaging support for a surveying operation.

4,888,882

METHOD AND APPARATUS FOR DRYING A PARTICULATE MATERIAL SUCH AS BARK

Rolf Ryham, 17 Heath Ct., Princeton, N.J. 08540

PCT No. PCT/SE87/00378, § 371 Date Mar. 1, 1989, § 102(e) Date Mar. 1, 1989, PCT Pub. No. WO88/01717, PCT Pub. Date Mar. 10, 1988
PCT Filed Aug. 27, 1987, Ser. No. 326,543
Int. Cl.[4] F26B *3/10*
U.S. Cl. 34—10 **11 Claims**



1. A method of drying a particulate material, especially bark, comprising:

arranging an annular bed of said material on an annular drying medium-permeable stationary support;

passing a drying medium upwards through said support and said bed;

moving said bed in the circumferential direction thereof on said stationary support;

removing dried material from the lower surface of the bed through said support while the bed is moving and depositing new material on the upper surface of the bed while essentially maintaining a uniform bed thickness; and

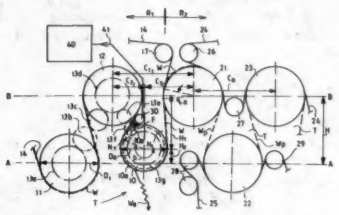
passing said drying medium through said bed such that when leaving said bed said drying medium has a substantially uniform moisture content in essentially all part areas of said bed permeated by said drying medium.

4,888,883

DRAWING A WEB THROUGH A MULTI-CYLINDER DRYING SECTION

Reima Kerttula, Charlotte, assignor to Valmet Paper Machinery Inc., Finland

Filed Apr. 6, 1988, Ser. No. 178,208
Claims priority, application Finland, Apr. 6, 1987, 871493
Int. Cl.[4] F26B *11/02*
U.S. Cl. 34—116 **29 Claims**



1. A multicylinder dryer in a paper machine, comprising a plurality of successive cylinder sections, at least one of which having a twin-wire draw in a manner such that a web being dried is drawn unsupported between cylinder rows, and in which a closed draw is arranged in a gap between said sections in a manner such that a drying or supporting wire of a preceding section is led to touch a top cylinder of a following section at a small angle, comprising

a section gap cylinder being situated near said section gap,

said section gap cylinder not driven or coupled to a drive of said preceding section,

said drying or supporting wire is wound over a sector of said section gap cylinder and either constitutes a single wire draw or a top wire of a twin-wire draw of said preceding section, and

said drying or supporting wire is arranged for supporting and guiding the web as a substantially vertical run between said sector of said section gap cylinder and said top cylinder of said following section.

4,888,884

METHOD AND PLANT FOR CLEANING DRYER EXHAUST GASES DURING THE DRYING OF WOOD CHIPS, WOOD FIBER OF THE LIKE

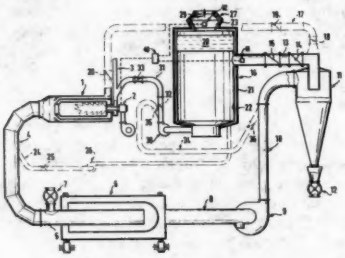
Werner Bartling, Elze, and Fritz H. Jagode, Hameln, both of Fed. Rep. of Germany, assignors to Bison-Werke Baehre and Greten GmbH & Co. KG, both of Springe, Fed. Rep. of Germany

Filed May 10, 1988, Ser. No. 192,272

Claims priority, application Fed. Rep. of Germany, May 11, 1987, 3715668

Int. Cl.[4] F26B *3/04*

U.S. Cl. 34—32 **15 Claims**



1. A method of cleaning dryer exhaust gases during drying of wood chips, wood fibers or the like by means of hot gases generated in a combustion chamber, wherein the dried material is separated from the dryer exhaust gases and provision is made for the filtering of the dryer exhaust gases, characterised in that at least a part of the dryer exhaust gases is filtered at a temperature above its dew point in filter hoses, filter sacks or the like; and in that at least a part of the particles which are filtered out thereby are conveyed, together with flushing air which serves to clean the filter hoses, sacks or the like and which has a temperature above the dew point, substantially continuously into a combustion chamber for the generation of hot gases and is burned.

4,888,885

DRYER FOR COMBUSTIBLE CHIP-LIKE MATERIAL

Robert A. Caughey, Antrim, N.H., assignor to New Hampshire Flakeboard, Inc., Antrim, N.H.

Filed Nov. 18, 1987, Ser. No. 122,045

Int. Cl.[4] F26B *3/00*

U.S. Cl. 34—33 **29 Claims**

1. A dryer for drying chip-like material, said dryer comprising

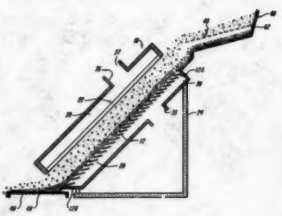
A. an inclined, transport ramp, including

(i) first and second parallel sides,

(ii) an inclined and generally planar ramp bottom extending longitudinally between a top feed end and a bottom discharge end and laterally between said sides for supporting a bed of said material for gravitational movement down said transport from said top fe 1 end to said bottom discharge end,

(iii) a gas-permeable top material-retainer in spaced, longitudinal relation to said ramp bottom and intermediate said sides, at a predetermined height above said ramp bottom, said top material-retainer, ramp bottom and sides bounding a material chute,

B. means for selectively introducing a flow of warm gas to said ramp bottom for passage through said chute along its



thickness dimension between said ramp bottom and said retainer,

C. feed means for delivering said material to said transport at said top feed end, and

D. discharge means for removing said material from said transport ramp at said bottom discharge end.

4,888,886

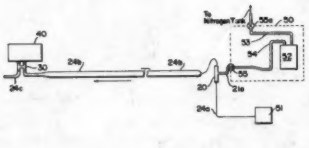
APPARATUS FOR USE IN IMPREGNATING ELECTRICAL CABLES

George S. Eager, Jr., Upper Montclair; Bogdan Fryszczyn, South Plainfield, both of N.J., and Ernest H. Thalmann, Southern Pines, N.C., assignors to Empire State Electric Energy Research Corporation, New York, N.Y.

Filed Sep. 24, 1987, Ser. No. 100,776

Int. Cl.[4] F26B *25/00*

U.S. Cl. 34—104 **15 Claims**



1. An apparatus for introducing and withdrawing fluid with respect to the interior of a cable composed of conductive material covered with insulation comprising:

a fitting having a plurality of elongate sections extending radially from a point of intersection, said sections including:

(i) a fluid section having a hollow core of conductive material with an end adapted to be connected to a reservoir of fluid;

(ii) an electricity section having an essentially solid core of conductive material, adapted to be connected to a conductor of electric current; and

(iii) an electricity-and-fluid section having a hollow core of conductive material in communication with said hollow core of conductive material of said fluid section adapted to be connected to a length of said cable through which fluid and electric current are to be passed.

4,888,887

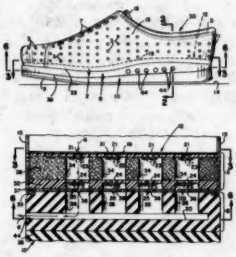
SUCTION-VENTILATED SHOE SYSTEM

Terry S. Solow, 410 Playa Blvd., La Selva Beach, Calif. 95076

Continuation-in-part of Ser. No. 269,019, Nov. 9, 1988, abandoned, which is a continuation-in-part of Ser. No. 74,255, Jul. 16, 1987, abandoned. This application May 22, 1989, Ser. No. 354,740

Int. Cl.[4] A43B *7/06, 13/20, 13/40*

U.S. Cl. 36—3 R **18 Claims**



1. A suction-ventilated shoe system, comprising:

a shoe having at least one, air-exit port means located on its outer surface for exhausting air out of said shoe, and

a suction-ventilated insole carried by said shoe, where said insole contains multiple, air-vent means plus foot-operated, multiple, suction-pump means, where said multiple, suction-pump means are connected to said multiple, air-vent means, wherein each one of said multiple, suction-pump means contains two, one-way, air-valve means, and

air-duct means that are connected between said multiple, suction-pump means of said insole and said at least one, air-exit port means of said shoe.

4,888,888

SOLE PROTECTORS FOR SHOES

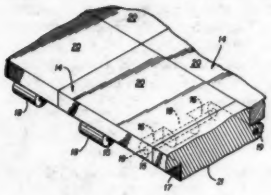
Douglas W. Ashton, 3917 North Point Blvd., Baltimore, Md. 21222

Filed Apr. 21, 1988, Ser. No. 184,416

Int. Cl.[4] A43B *13/38, 13/10;* **A43C** *13/12*

U.S. Cl. 36—43 **6 Claims**

1. A sole protector for a shoe structure, comprising, a sole protector for a shoe structure formed in the shape of a shoe sole, said sole protector being formed of impenetrable material and encased in a protective coating of material, said sole protector being arranged in representative substantially square sections within the peripheral area of said sole protector, with non-square sections being arranged at the peripheral portion thereof to form the curvature of said sole protector, and hinge



means for coupling said square and non-square sections together to form said sole protector.

4,888,889

SUPPORT ADJUSTER DEVICE FOR THE QUARTERS OF SKI BOOTS

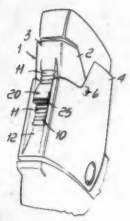
Mariano Sartor, Montebelluna, Italy, assignor to Nordica S.P.A., Montebelluna, Italy

Filed Jan. 5, 1987, Ser. No. 785

Claims priority, application Italy, Jan. 13, 1986, 20463 B/86

Int. Cl.[4] A43B *5/04*

U.S. Cl. 36—117 **2 Claims**



1. In a ski boot of the type comprising a foot portion supporting front quarter and a rear quarter and a boot closure means for exerting a clamping action on a skier's foot, a support adjuster device associated with at least one of said front and rear quaters and arranged for bearing against a tibial portion, respectively a calf portion of a skier's lower leg, said support adjuster device including a main body shaped to at least partially embrace said tibial portion, respectively said calf portion of the skier's lower leg and means for movably connecting said body with the upper end of the associated quarter, the improvement consisting in that said support adjuster device further comprises portion adjustment means for selectively adjusting the position thereof with respect to the associated quarter independently from the operating position of said boot closure means, releasably locking means being provided for

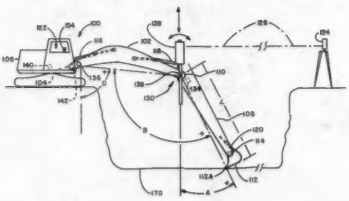
releasably locking said device in said independently adjusted position, to thereby cause said device to exert on said tibial portion, respectively said calf portion of the skier's lower leg a supporting action of selected value independent from the clamping action exerted on the skier's foot by said boot closure means, wherein said main body comprises a pair of lateral fins extending on either side of said tibial portion, respectively said calf portion of the skier's lower leg, the fins of said pair being mutually connected by a central portion extending transversely of said lateral fins and arranged to face said tibial portion, respectively said calf portion of the skier's lower leg, and wherein said movably connecting means comprises a pivot means provided on each lateral fin of said pair in a location proximate a free end thereof for oscillably coupling said main body with a respective one of said front and rear quarters to thereby permit forward and backward oscillation thereof in a substantially vertical plane parallel to the wearer's foot and wherein said position adjustment means comprises an elongated tab extending downwardly from said central portion of said main body along a substantially parallel direction to the skier's lower leg, each quarter having proximately to the upper end thereof a recess providing a longitudinal passage for said tab, the position of said tab with respect to said recess defining the positional adjustment of said device with respect to the associated quarter.

4,888,890

LASER CONTROL OF EXCAVATING MACHINE DIGGING DEPTH

Robert H. Studebaker; Ted L. Teach, and Michael H. Kidwell, all of Huber Heights, Ohio, assignors to Spectra-Physics, Inc., San Jose, Calif.

Filed Nov. 14, 1988, Ser. No. 270,645
Int. Cl.[4] E02F *3/32*
U.S. Cl. 37—103 **34 Claims**



1. Apparatus for controlling the working depth of a bucket of an excavating machine having an outreach boom which is pivotally attached at one end to said machine, a downreach boom pivotally attached to the opposite end of said outreach boom, a digging bucket pivotally attached to the end of said downreach boom opposite to that to which the outreach boom is attached, and power means for producing relative pivotal movements of the pivotally interconnected elements, said apparatus comprising:

laser beam projection means for projecting a beam of laser light at a reference height;

beam sensor means mounted on said outreach boom for detecting said beam of laser light, said beam sensor means defining a plurality of individual sensor locations sized such that one of said sensor locations can be identified as sensing said beam of laser light;

angle sensor means for detecting the angular orientation of said downreach boom relative to vertical; and

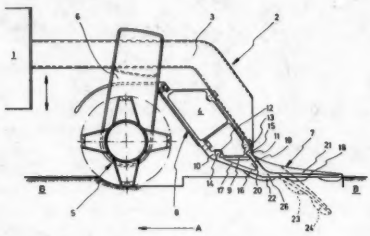
control means connected to said beam sensor means and said angle sensor means for repetitively defining as a function of the angular orientation of said downreach boom one of said plurality of individual sensor locations as an on-grade sensor location for said beam sensor means, and for comparing said on-grade sensor location to the sensor location having detected said beam of laser light to generate an outreach boom adjustment signal representative of the movement of said outreach boom required to move the machine such that said on-grade sensor location is illuminated by said beam of laser light and thereby maintain said bucket on-grade as said downreach boom is pivoted with respect to said outreach boom.

4,888,891

LEVELLING ATTACHMENT

Walter Haug, Winterhalde, Fed. Rep. of Germany, assignor to Kassbohrer of North America, Inc., Me.

Division of Ser. No. 893,890, Aug. 6, 1986, Pat. No. 4,738,037.
This application Apr. 18, 1988, Ser. No. 182,973
Claims priority, application Fed. Rep. of Germany, Aug. 7, 1985, 8522791[U]
The portion of the term of this patent subsequent to Apr. 19, 2005, has been disclaimed.
Int. Cl.[4] E01H *4/00*
U.S. Cl. 37—222 **9 Claims**



1. For use with a maintenance vehicle or the like of the type employed to work the surface of snow on a ski trail, said vehicle having a rearwardly disposed carrier member extending transversely with respect to the direction of vehicle travel, a levelling attachment adapted to be carried by said carrier member and to level the surface of the thus worked snow, said levelling attachment comprising: a forward portion of generally triangular cross-sectional shape having three sides, said forward portion being adapted to be attached to said transverse carrier member along a first of said sides, a second of said sides being formed as a rigid compaction surface extending downwardly and rearwardly from the point of attachment of said forward portion to said transverse carrier member and being connected at its rear end to a plate-shaped flexible portion extending substantially parallel to said second side in the relaxed state, and in a substantially horizontal direction when under load against said snow surface, the third of said sides being formed as a support member extending from the rear end of side second side to said first side.

4,888,892

SCENIC VARIATION SYSTEMS

Fernando M. Ortega, C/ Antonio Lorenzo Hurtado No. 1, 47014, Valladolid, Spain

Filed Dec. 22, 1987, Ser. No. 136,371
Claims priority, application Spain, Dec. 24, 1986, 8603597
Int. Cl.[4] G09F *19/00*
U.S. Cl. 40—430 **7 Claims**

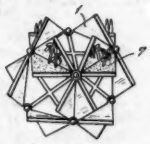
1. A system for changing scenery, said system comprising:

(A) an observation point;

(B) a plurality of scenery subassemblies for providing scenery observable above, beneath, and all around said observation point, each of said scenery subassemblies having an axis and two ends, said scenery subassemblies being arranged end-to-end with said axes defining the arrises of a polyhedron, each of said scenery subassemblies including:

(1) a plurality of planar sectors, said planar sectors forming equal dihedral angles; and

(2) scenery located on or between said planar sectors; and



(C) means for simultaneously rotating said scenery subassemblies about their respective axes to change said scenery observable above, beneath, and all around said observation point.

4,888,893

STRANDED MOTORIST DISTRESS SIGN

Jacqueline Jones, 1309 Fair Pines Cove, Stone Mountain, Ga. 30083

Filed Oct. 26, 1987, Ser. No. 112,483

Int. Cl.[4] G09F *21/04*

U.S. Cl. 40—592 **6 Claims**

1. A sign assembly for detachably mounting on a vehicle body comprising:

a substantailly flat, semi-flexible base member having a plurality of protrusions extending from one surface thereof, each of said protrusions having a flat face oriented substantially perpendicularly to said one surface,

first connecting means comprising a hook and loop material strip mounted on the flat face of each of said protrusions,

a substantially flat, semi-flexible sign plate having letters forming a message extending from one surface thereof, said letters being covered with a visibility enhancing material, the height of said sign plate being greater than the height of said protrusions,

second connecting means adapted to mate with said first connecting means mounted on the surface of said sign plate opposite the surface thereof containing said letters, and

a plurality of magnetic members affixed to the surface of said base member opposite the surface from which said protrusions extend, said magnetic members extending transversely of the longitudinal axis of said base member.

4,888,894

STAND FOR SAFETY SIGN OR THE LIKE

Herman O. Brown, Jr., 110 Cedar Ct., Marietta, Ga. 30067

Filed Sep. 14, 1988, Ser. No. 244,083

Int. Cl.[4] G09F *15/00*

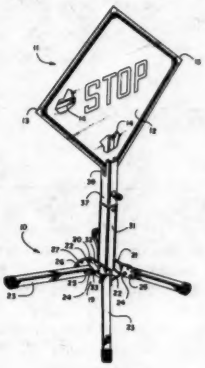
U.S. Cl. 40—606 **6 Claims**

1. Apparatus for supporting a safety sign or the like having a message panel and a mounting bracket adjacent an edge of the message panel, comprising:

base means;

a plurality of legs associated with the base means and selectively operative to engage the ground while maintaining the base means at a predetermined attitude in relation to the ground;

a socket carried by the base means and operative to receive and retain the mounting bracket of a safety sign, the socket comprising a tubular member open at an end to define a recess for receiving the mounting bracket; and



a slot in the tubular member to receive an adjacent edge portion of the message panel as the mounting bracket enters the recess.

so that the socket receives the mounting bracket to support the sign without interfering with the message panel.

4,888,895

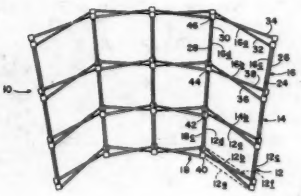
PORTABLE DISPLAY SYSTEM

Matthias D. Kemeny, 1625 SW. Westwood Dr., Portland, Oreg. 97201

Filed Jul. 29, 1988, Ser. No. 226,292

Int. Cl.[4] G09F *15/00*

U.S. Cl. 40—610 **48 Claims**



1. A portable display system comprising:

a collapsible rectangular frame including

a plurality of rectangular box units, each unit having a top side, bottom side, right side, left side, front face and rear face, wherein said top side, bottom side, right side and left side may be shared with adjoining box units, said top side, bottom side, right side and left side each being defined by a pair of arms, the arms in each pair being joined to one another by a scissor connection intermediate their ends, said top side arms and said bottom side arms further including a telescoping member in at least one of said arms of an arm pair, said telescoping member including a large-diameter element and a small-diameter element slidably received in said large-diameter element about said scissor connection; and

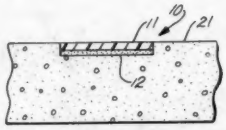
connector block nodes located at each corner of said box units, each of said nodes including pivot means for securing said arms thereto and for allowing collapsing of said frame to a compact form.

4,888,896

UTILITY CUT PATCH IDENTIFICATION TAG

Richard E. Sanchez, 1861 Kellerton Dr., Hacienda Heights, Calif. 91745

Filed Jun. 29, 1987, Ser. No. 67,935
Int. Cl.[4] G09F 3/04
U.S. Cl. 40—630 10 Claims



8. A method for repairing and identifying a cut out section of pavement comprising:

filling the cut out section of the pavement with a fresh paving material;

smoothing the fresh paving material so that the surface of the fresh paving material is generally flush with the surface of the surrounding pavement;

applying an identifying tag to the surface of the paving material, said identification tag having a top surface area of no more that about five square inches and comprising a generally flat wafer made of a pliant, durable polymeric material with upper and lower surfaces, and indicia means for visually conveying a predetermined message; and

pressing the identification tag into the paving material so that the wafer is at least partially embedded within the top surface of the paving material.

4,888,897

PRODUCT IDENTIFICATION TAG WITH SPECIALIZED MOUNTING PORTION

Jacob Fast, 7561 NW. 9th St., Plantation, Fla. 33317

Filed Oct. 7, 1988, Ser. No. 254,572
Int. Cl.[4] A47G 29/10
U.S. Cl. 40—657 8 Claims

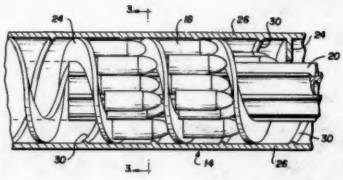
1. A product information and display tag comprising an elongate blank of sheet material having a proximal end mounting portion for attachment at a proximal end of an elongate product display hook, an elongate intermediate portion extending from the mounting portion for projecting over the hook, and a distal end display portion at a distal end of the intermediate portion for displaying product information at a distal end of the hook, wherein the mounting portion of the blank comprises a lengthwise succession of panels for folding into a wedge behind the intermediate portion with adjacent ones of said panels defining front and rear wedge surfaces converging downwardly to an apex, a pair of transversely spaced apertures in each of said panels adapted to align when the panels are folded as aforesaid for allowing suitably spaced hook prongs to be inserted through the wedge, and a central cut-out in one of said adjacent ones of said panels which defines the front wedge surface, said cut-out being located substantially at one end of said one panel which defines an upper end of the front wedge surface.

4,888,898

LARGE CAPACITY AMMUNITION MAGAZINE

Michael K. Miller, and Warren D. Stockton, both of 405 E. 19th St., Bakersfield, Calif. 93305

Filed Oct. 20, 1988, Ser. No. 260,052
Int. Cl.[4] F41C 25/10; F41D 10/12, 10/24
U.S. Cl. 42—49.01 3 Claims



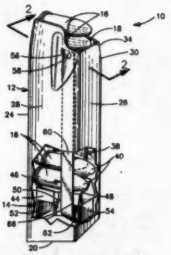
1. An ammunition magazine for a gun, said magazine being of an elongated, generally cylindrical configuration, said magazine comprising an outer housing, a drive member for ammunition cartridges rotatably mounted within said outer housing, said drive member being formed with a plurality of flutes extending at least generally axially of said drive member, said flutes being so configured as to permit a succession of said cartridges to pass therethrough in end-to-end relationship, said drive member having a predetermined outside diameter, said outer housing having a predetermined inside diameter, said drive member outside diameter and said housing inside diameter both being predetermined with respect to the particular size of the ammunition cartridges with which said magazine is to be used so that said cartridges are arranged in said magazine in nested inner and outer helical rows, the cartridges in said inner helical row being located in the flutes of said drive member, each cartridge in said outer helical row being located radially outwardly and tangentially in contact with two adjacent cartridges in said inner helical row, said housing comprising helical rib means on the inside surface thereof cooperable with the cartridges in both of said helical rows, and feed ramp means at the cartridge exit of said magazine to permit the cartridges therein to be fed one by one out of said magazine.

4,888,899

MAGAZINE FOR HOUSING CARTRIDGES USING A SPIRALLY WOUND CONFORCE SPRING

M. Gaines Chesnut, Kremmling, and W. Lawrence Wood, Lakewood, both of Colo., assignors to Ram-Line, Inc., Golden, Colo.

Continuation-in-part of Ser. No. 34,328, Apr. 3, 1987, abandoned. This application Jul. 12, 1988, Ser. No. 218,109
Int. Cl.[4] F41C 25/02
U.S. Cl. 42—50 19 Claims



1. A magazine for housing cartridges, comprising: a maga-

zine body including a top portion, a bottom portion, first and second end walls, first and second side walls, each of said first and second side walls having a greater width than each of said first and second end walls, said first and second end walls and side walls defining a magazine chamber for storing cartridges, said magazine body housing a double column arrangement of cartridges and including a transition portion located adjacent to said top portion of said magazine body wherein the cartridges move from a double column arrangement to a single column arrangement;

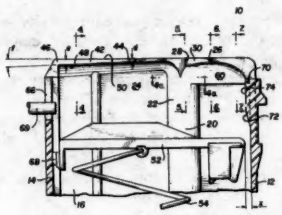
a follower assembly including a follower body and spirally wound conforce spring means, said follower body including a nesting area located near a front end portion of said follower body, and said conforce spring means including a free end connected to said first side wall and, when said magazine body contains cartridges, said conforce spring means includes an unwound portion and a wound portion, said unwound portion of said conforce spring means extending along said first side wall adjacent to nose ends of the cartridges and at least a part of said wound portion of said conforce spring means being received in said nesting area, which is adjacent to the nose ends of the cartridges, wherein said conforce spring means includes at least a first conforce spring and a second conforce spring separate from said first conforce spring, said second conforce spring overlying and contacting substantial portions of said first conforce spring wherein increased spring force is provided along substantially the same longitudinal extent of said first side wall using said first and second conforce springs.

4,888,900

MAGAZINE

William J. Howard, P.O. Box 573, Wilson, N.C. 27893

Filed Mar. 9, 1988, Ser. No. 165,979
Int. Cl.[4] F41C *25/02*
U.S. Cl. 42—50 5 Claims



1. A magazine for holding a plurality of cartridges in two adjacent parallel rows, and for feeding these cartridges sequentially to a firearm equipped with a bolt-latch pin, which, when actuated, will prevent the bolt from closing on an empty chamber; said magazine comprising:

A. a rear wall having a slot therein; and

B a front wall having a ramp thereon, wherein the ramp fits between the parallel rows of cartridges; and

C. an upwardly biased follower carrying at its rear, a bolt-latch actuator; and

D. wherein the follower fits between the front wall and the rear wall when the follower is below the ramp; and

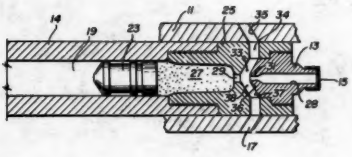
E. wherein, when the follower is opposite the ramp, the ramp urges the follower rearwardly such that the bolt latch actuator contacts the bolt-latch pin in the slot in the rear wall.

4,888,901

FIREARM

Kendrick L. French, Lebanon, Me., and Mark C. Laney, New Market, N.H., assignors to K. W. Thompson Tool Co., Inc., Rochester, N.H.

Filed Apr. 25, 1989, Ser. No. 342,998
Int. Cl.[4] F41C *21/00*
U.S. Cl. 42—51 4 Claims



1. A firearm, comprising:

(a) a receiver,

(b) a barrel mounted in the receiver and having a bore to receive a projectile,

(c) a chamber element mounted on the rear end of the barrel and having a generally cylindrical chamber facing down the barrel coaxially of the bore, and

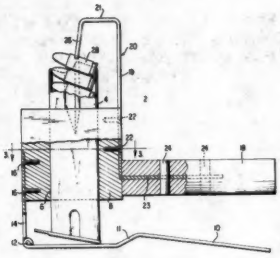
(d) a nipple mounted at the rear end of the chamber element and having a primer bore which is coaxial of the bore and the chamber, wherein a venting passage extends through the chamber element and the receiver to the exterior from the axis of the bore to both exterior sides of the receiver.

4,888,902

GUN MAGAZINE LOADER

Carter L. Knowles, 11105 Lourdes St., Greenville, Miss. 38701

Filed Jun. 2, 1989, Ser. No. 360,532
Int. Cl.[4] F42B *39/06*
U.S. Cl. 42—90 9 Claims



1. A device for loading firearm cartridges into a magazine comprising:

body means including a channel therethrough open at both ends for receiving a magazine having an open upper end and a closed lower end;

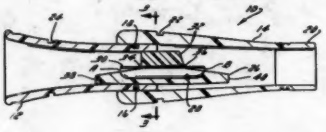
means attached to said body means for exerting upward force on the lower end of the magazine;

fixed rigid means attached to said body means for biasing cartridges contained in the magazine away from the open upper end of the magazine,

whereby exerting upward force on the lower end of the magazine forces the magazine upwardly whereby said fixed biasing means engages an uppermost cartridge in said magazine and holds said uppermost cartridge in position away from the open upper end of the magazine for

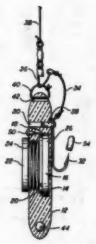
facilitating insertion of a further cartridge into the magazine on top of said uppermost cartridge.

4,888,903
GAME CALL
Harold W. Knight, and David E. Hale, both of Box 468, Cadiz, Ky. 42211
Filed Sep. 30, 1988, Ser. No. 251,540
Int. Cl.[4] A63H *5/00*
U.S. Cl. 43—1 **5 Claims**



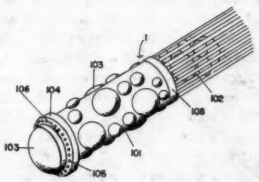
1. A game call, comprising:
a tubular casing, with one end of the tubular casing defining a mouthpiece and the other end defining an outlet;
a base member inside said tubular casing defining an elongated trough in its upper surface and defining a first ramp tapering downward toward said outlet and a second ramp tapering downward toward said mouthpiece;
a reed overlying said trough;
a stopper located over said reed and press fit inside said tubular casing so as to define two pinch points on said reed, leaving first and second end segments of said reed free to vibrate, wherein the first end segment of said reed is directed toward said outlet and the second end segment of said reed is directed toward said mouthpiece;
wherein said reed is substantially between 0.007 inches and 0.011 inches thick and the trough is less than three inches long, and wherein said game call is adapted to imitate the sound of a given type of game both upon blowing into said mouthpiece and upon sucking on said mouthpiece.

4,888,904
FISHING LURE WITH LCD BAIT
Johnny H. Douglas, Jr., P.O. Box 1724, Syracuse, N.Y. 13201
Filed Apr. 11, 1988, Ser. No. 180,136
Int. Cl.[4] A01K *75/02*
U.S. Cl. 43—17.6 **13 Claims**



1. A fishing lure presenting in outline form a visual image of an insect, worm, or other form of live bait, said lure comprising:
(a) a liquid crystal device having a plurality of segments independently actuable to render said segments visibly distinct;
(b) an electrical power source adapted to actuate said segments when connected thereto;
(c) programming means for connecting said power source to predetermined ones of said segments to produce said outline image of said live bait; and
(d) a fish hook supported in predetermined relation to said image.

4,888,905
ENHANCED LIGHT FISHING LURE
Michael M. Garr, 1 Ziska Ave., Jericho, N.Y. 11753
Continuation of Ser. No. 848,697, Apr. 4, 1986, abandoned, Continuation-in-part of Ser. No. 910,310, Sep. 22, 1986, Pat. No. 4,727,674, Continuation of Ser. No. 661,162, Oct. 15, 1984, abandoned. This application Oct. 6, 1987, Ser. No. 107,846
Int. Cl.[4] A01K *85/00*
U.S. Cl. 43—17.6 **15 Claims**



1. A light emitting fishing lure comprising:
(a) a transparent lure body having an index of refraction greater than that of water and defining a lure cavity having an orifice communicating with the space outside said lure body, said lure body acting as a large diameter single fiber optic member, defining a relatively regular outside surface portion on said lure body;
(b) a cap for closing said orifice;
(c) engagement means adapted to mate with said cap, said engagement means being secured around said orifice to permit said orifice to be closed by said cap;
(d) a battery configured and dimensioned to pass through said orifice;
(e) circuit means adapted to receive said battery and provide a non-uniform pulsing electrical signal in response thereto; and
(f) a light emitting device connected to receive said electrical signal, said lure body being optically coupled to said light emitting;
(g) a collar containing channels for the passage of water such that the diameter of the entrance of the channel is greater than the diameter of the exit of the channel resulting in bubbles passing along the body of the light emitting lure; and
(h) a plurality of refractive contours defined by the surface of said lure body and extending away from said relatively regular surface portion and having an index of refraction substantially the same as the index of refraction of said lure body and having outside surfaces shaped to increase the angle of incidence with respect to said outside surface for light conducted through said lure body.

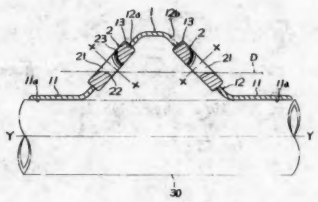
4,888,906
FISHING LINE GUIDE
Yoshiro Yamato, Sakai, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan
Filed Apr. 21, 1989, Ser. No. 341,222
Claims priority, application Japan, Apr. 23, 1988, 63-54736[U]
Int. Cl.[4] A01K *87/04*
U.S. Cl. 43—24 **2 Claims**

1. A fishing line guide mounted on the outer surface of a fishing rod, comprising:
a guide body having a mounting surface extending lengthwise of said fishing rod and a rising portion rising from

said mounting surface, and having a holding bore at said rising portion; and

a line guide ring mounted to said holding bore at said guide body and having a guide bore;

so that the axis of said holding bore at said guide body is slanted longitudinally with respect to the center line of said



fishing rod extending lengthwise thereof, said guide bore at said line guide ring being formed at the inner surface in a quarter circle in section, said line guide ring being mounted to said holding bore in the relation that the arcuate inner surface of said guide bore orients slantwise outwardly of said holding bore.

4,888,907

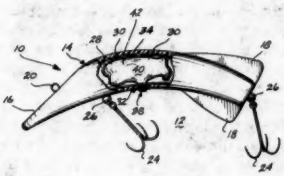
CONTROLLED ATTRACTANT-DISCHARGE MECHANISM FOR FISHING LURES

Floyd M. Gibbs, 795 S. Balls Ferry Rd., Anderson, Calif. 96007

Filed Dec. 8, 1988, Ser. No. 282,022

Int. Cl.[4] A01K *97/02*

U.S. Cl. 43—42.06 **9 Claims**



1. A fishing lure, for controllably discharging an attractant, comprising:

a lure body;

a bladder, positionable in said lure body, for receiving and discharging the attractant; and

a valve, coupled to said bladder, for controlling the discharge of the attractant from said bladder, said lure body including an outer surface and an opening that maintains said bladder in fluid communication with said outer surface when said bladder is positioned in said lure body.

4,888,908

TANDEM BLADE SPINNER BAIT

John L. Morris, Springfield, Mo., assignor to Bass Pro Shops, Inc., Springfield, Mo.

Continuation of Ser. No. 172,789, Mar. 28, 1988, abandoned. This application Mar. 30, 1989, Ser. No. 332,365

Int. Cl.[4] A01K *85/00*

U.S. Cl. 43—42.14 **20 Claims**

1. A spinner bait fishing lure comprising:

a body portion;

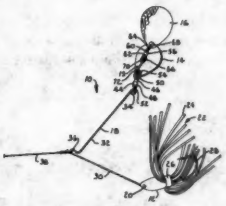
a hook coupled with said body portion;

first and second spinner blades;

a shank extending from said body portion;

first means pivotally coupling said first spinner blade with said shank and allowing rotation of said blade; and

second means coupling said second spinner blade with said first spinner blade and allowing rotation of said second



spinner blade about a common axis with said first spinner blade as said lure is allowed to sink to a depth in a body of water as well as when said lure is pulled through said body of water.

4,888,909

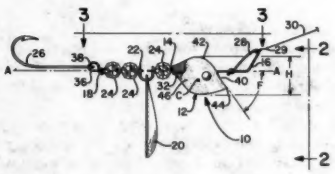
FISHING LURE

Gerald A. Adams, 128 Beck St., Wadsworth, Ohio 44281

Filed Nov. 14, 1988, Ser. No. 270,028

Int. Cl.[4] A01K *85/00*

U.S. Cl. 43—42.16 **14 Claims**



1. A fishing lure comprising a head member, a core wire extending from a leading end through said head member to a trailing end of said core wire, a hook connected to said trailing end of said core wire, a straight bore extending through said head member with said core wire extending through said bore, said bore having a diameter greater than the diameter of said core wire so that said head member can swing freely on said core wire, body means connected to said core wire at a position between said head member and said trailing end of said core wire, a leading end connecting means at said leading end of said core wire for attachment to a fishing line, and reflecting means on a surface of said head member.

4,888,910

ADJUSTABLE SNELLED FISH HOOK ASSEMBLY

Roger C. Lewis, 117 Knollwood, Clawson, Mich. 48017

Filed Dec. 11, 1987, Ser. No. 131,848

Int. Cl.[4] A01K *83/06*

U.S. Cl. 43—44.82 **6 Claims**

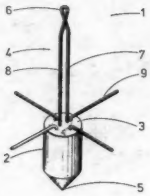
1. An adjustable snelled hook assembly comprising an elongated flexible leader adapted for connection to a fishing line;

a hook having a shank, an eye and a barb, with the eye loosely and slidably mounted upon leader;
a coiled spring loosely surrounding and mounted upon said shank;
said shank being generally parallel to and closely adjacent said leader; and
a plurality of continuous windings of said leader intermediate its ends extending around and snugly engaging said spring and shank for adjustably securing said hook upon said leader.

4,888,911
SINKER

Kelvin R. D. Pritchard, 11 Moana Place, Morrinsville, New Zealand

Filed Apr. 18, 1988, Ser. No. 183,003
Int. Cl.[4] A01K *95/00*
U.S. Cl. 43—44.96 2 Claims

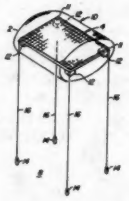


1. A sinker for a fishing line, comprised of:
a solid cylindrical body formed from a heavy weight material and having an aerodynamically tapered first end and a substantially planar second end, said cylindrical body being of a first axial length; and
a loop of rigid wire rigidly secured at opposite ends of said loop in said solid cylindrical body and extending substantially parallel to the longitudinal axis of said cylindrical body, said wire loop having an axial length extending from planar second end of at least twice the axial length of said body.

4,888,912
NUTRIENT DEPLETING ENVELOPES CONTAINING AQUATIC PLANTS

David P. Murray, 853 Wiget La., Walnut Creek, Calif. 94598

Filed Jul. 12, 1988, Ser. No. 217,927
Int. Cl.[4] A01G *31/02*
U.S. Cl. 47—1.4 21 Claims

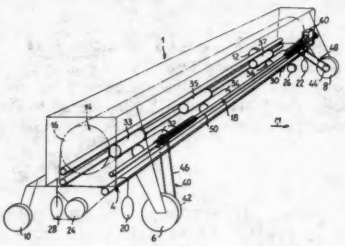


18. A system for depleting plant nutrient compounds in a open body of fresh water comprising:
an aquatic plant;
a envelope for containing the aquatic plant, said envelope permitting exchange of water and passage of light sufficient to support the growth of the plant, said envelope fully containing the plant such that the plant cannot escape into the body of water;
a plant growth support structure contained within the envelope; and
floats attached to the system so as to suspend the envelope within a photo zone of the body of water.

4,888,913
PLASTIC FILM FEEDING MACHINE, AS USED IN AGRICULTURE

Benoit Hoeft, Kaysersberg, France, assignor to Kaysersberg S.A., Kaysersberg, France

Filed Feb. 10, 1988, Ser. No. 154,586
Claims priority, application France, Feb. 17, 1987, 87 02047
Int. Cl.[4] A01G *7/00*
U.S. Cl. 47—9 7 Claims



1. Plastic film feeding machine of the type used in agriculture for towing by a traction device comprising a chassis mounted on a plurality of carrying wheels, a film drum provided within the said chassis and rotating with respect to said chassis to lay film on the ground when said machine is to be towed, means for opening a furrow in the soil at each edge of said film, wheels for maintaining the edges of said film in each furrow as it is formed, and means for burying the film maintained in each furrow; said drum being mounted to rotate on supporting rollers and on drive rollers and at least one of said carrying wheels of said chassis being a traction wheel driving said drive rollers for said drum through a drive means which comprises a mechanical variable speed drive including means to vary the transmission ratio between said traction wheel and said drive rollers.

4,888,914
METHOD AND FABRIC CONTAINER FOR CONTROLLING ROOT GROWTH

Ralph E. Reiger, 4131 N. Portland, Oklahoma City, Okla. 73112

Filed May 23, 1988, Ser. No. 197,572
Int. Cl.[4] A01G *23/04, 9/02*
U.S. Cl. 47—78 7 Claims

1. In a method of controlling the root growth of nursery

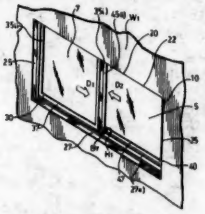
stock planted in the ground prior to transplanting such nursery stock wherein said root growth is confined within a porous fabric container having sufficient strength to constrict penetrating roots whereby root growth outside the container is restricted and enlarged root nodule formation and root branching are promoted within the container, the improvement which comprises confining said root growth within a container formed of a porous needle punched fabric of woven continuous fibers whereby said roots are readily caught by and caused to initially penetrate said fabric but are sufficiently constricted thereby to produce said nodule formation and root branching.

4,888,915

TILT SLIDER

Shaul Goldenberg, 147 Carrington Drive, Richmond Hill, Ontario, Canada L4C 7Z1 , assignor to Shaul Goldenberg, Richmond Hill, Canada

Filed Dec. 21, 1988, Ser. No. 287,327
Claims priority, application Canada, Sep. 14, 1988, 577393
Int. Cl.[4] E05D *15/22*
U.S. Cl. 49—181 **23 Claims**



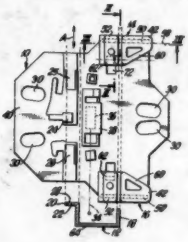
1. A pivoting and sliding closure assembly comprising:
(i) an opening extending between a peripheral frame said peripheral frame including a header portion, a sill portion and two vertically extending jamb portions
(ii) the sill and header portions or the two jamb portions having disposed therein or attached thereto track portions extending in a substantially parallel direction to the extensions of said peripheral frame portions
(ii)(a) at least one closure member slidable within said track portions and pivotable at at least one end thereof and latchable at the other end thereof
(iii) each track portions having disposed therein at least two pivot shoes being interconnected by interconnecting means, each pivot shoe including a carrier portion having a top and bottom, the carrier further having interconnecting portions therein to interconnect with the interconnecting means the carrier portion having disposed therein an opening extending from top to bottom wherein camming means are disposed, said camming means being moveable to cause locking means disposed with said pivot shoe to engage and lock the pivot shoe from sliding movement in the track portions
(iv) some of the camming means of some of the pivot shoes having engagement means therein for engagement with pivot means of the at least one closure member to allow the at least one closure member to rotate when free to do so and upon rotation thereof to cause the camming means to rotate thus locking the locking means of the pivot shoe
(v) some of the camming means of some of pivot shoes having latching means engaged therewith for latching the at least one closure member having latch engaging means thereon to prevent the closure member from pivoting upon its pivot means when the closure member remains slidable with said track and which when disengaged locks the pivot shoe in position with respect to the track by engaging the locking means thereof
(vi) the at least one closure member being braced from sagging by the interconnecting means interconnecting the pivot shoes disposed in each track, the interconnecting means further preventing the pivot means from disengaging from the relevant pivot shoe when the at least one closure member is rotated to an open position.

4,888,916

DRIVE ARRANGEMENT FOR A WINDOW LIFTING MECHANISM

Hans-Peter Hess, and Peter Hlousek, both of Coburg, Fed. Rep. of Germany, assignors to Brose Fahzeugteile GmbH & Co. Kommanditgesellschaft, Coburg, Fed. Rep. of Germany

Filed Aug. 18, 1988, Ser. No. 233,666
Claims priority, application Fed. Rep. of Germany, Aug. 24, 1987, 8711470
Int. Cl.[4] E05F *11/48*
U.S. Cl. 49—352 **7 Claims**



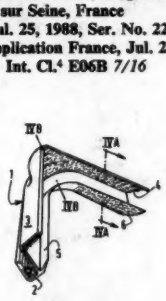
1. A driver (10) for a window lifting mechanism, comprising:
a driver plate (40) having a plate plane;
a guide rail (12) having a section with a leg (18) arrange to extend in the direction of the plate plane; and
at least one slider pair (14, 16) arranged so as to guide the leg, each slider (60, 62) of the at least one slider pair being formed of at least one sheet metal tab (50, 52) bent out of the plate plane of the driver plate, the at least one sheet metal tab being covered with an injection molded material, and a sheet metal web (54) bent out of the plate plane and arranged so as to connect together the at least one sheet metal tab of each slider, the sheet metal tabs and the sheet metal web sharing a bending edge (58).

4,888,917

DEFORMABLE SEALING MEMBER

Francois Mesnel, Neuilly sur Seine, and Gérard Mesnel, Carrieres-sur-Seine, both of France, assignors to Etablissements Mesnel, Carrieres sur Seine, France

Filed Jul. 25, 1988, Ser. No. 223,858
Claims priority, application France, Jul. 23, 1987, 87 10462
Int. Cl.[4] E06B *7/16*
U.S. Cl. 49—479 **9 Claims**



1. An apparatus, comprising:
a one piece extrusion of synthetic material, at least partly reinforced, for a sliding window frame and associated sliding window pane, of which at least one part forms a sealing joint for the window pane in a window-closed

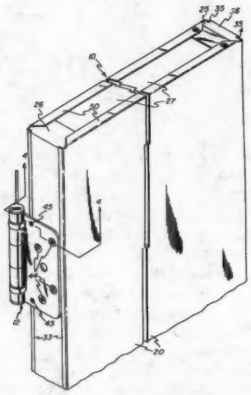
position, the piece comprising a first part of U-shaped section, which covers and pinches a rabbet of the frame, and a second part, adjoining the first part and intended to come into contact with an edge portion of the associated sliding window pane in the window-closed position, the second part bearing against a surface of the frame, substantially adjacent to the rabbet, wherein the second part has a core of a metallic material, said first and second parts having a straight portion and a longitudinally bent portion, the second part being spaced from said first part by an amount which varies radially outward in said bent portion to permit said second part to follow a curve of said window pane.

4,888,918

FIRE-RESISTANT DOOR

F. Richard Green, Fairfield, and Charles C. Kreimer, Cincinnati, both of Ohio, assignors to Pease Industries, Inc., Fairfield, Ohio

Filed Feb. 14, 1989, Ser. No. 310,791
Int. Cl.[4] E06B *3/00*
U.S. Cl. 49—501 **10 Claims**



1. A fire resistant door for hinges mounting in a door frame having a hinge jamb and a lock jamb, comprising:

(a) means including wood hinge side and lock side stiles and wood top and bottom rails forming a rectangular door skeleton,

(b) a pair of rectangular metal skins each covering one side of said door skeleton and having an integral inturned flange along each edge thereof interfitting with the adjacent said stile or rail,

(c) each of said flanges being substantially less in width than one-half the thickness of said stiles whereby a substantial portion of the outer edge of each of said stiles extends between opposed said flanges,

(d) a plurality of leaf hinges mounted in spaced relation on said hinge side stile,

(e) means securing one leaf of each said hinge directly to one of said flanges interfitting with said hinge side stile, and

(f) mechanical means substantially more combustion-resistant than wood forming a direct connection between said skins at a position adjacent said lock side stile,

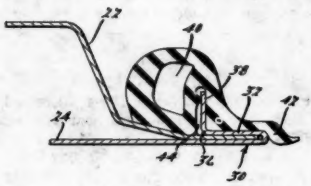
(g) whereby upon combustion of said stiles and rails while said door is mounted in a door frame, said skin secured to said hinges will remain attached to said hinge side of said frame through said hinges, and said skins will remain directly connected to each other adjacent said lock jamb of said frame.

4,888,919

CLOSURE PANEL FOR AUTOMATIVE BODIES

Gordon G. Strosberg, Southfield; Adam M. Janotik, Grosse Ile, and Derek F. Gentle, Birmingham, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jan. 12, 1989, Ser. No. 296,102
Int. Cl.[4] B60J *5/04*
U.S. Cl. 49—502 **12 Claims**



1. A door assembly swingably mountable on an automobile body to open and close an aperture formed through the body, the door being of the type formed from an inner and an outer panel secured together at their outer peripheries, the door assembly comprising:

an upturned flange integrally formed with one of the panels proximate the outer periphery thereof and extending toward the body;

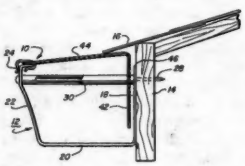
and a seal member mounted on the flange for sealing engagement with the body when the door assembly is swung closed with respect to the body aperture.

4,888,920

GUTTER ANTI-CLOGGING DEVICE

Walter J. Marulic, Box 164C, Cumming, Ga. 30130

Filed Aug. 24, 1988, Ser. No. 235,479
Int. Cl.[4] F04D *13/06*
U.S. Cl. 52—12 **1 Claim**



1. An easily removable and replaceable gutter anti-clogging device for presenting a gutter affixed to a facia of a building from being clogged with debris, the gutter being mounted beneath an overhang of a roof and having a basically U-shaped cross section with an inner gutter leg extending upwardly and longitudinally along the facia, a gutter base extending generally horizontally outwardly from and longitudinally along, the inner gutter leg, and an outer gutter leg extending upward from, and longitudinally along, the gutter base, and having an upper inturned portion, said gutter anti-clogging device comprising:

a screen mesh, defining mesh orifices surrounded by longitudinal wire and transverse wire, extending longitudinally along the gutter and having an acute angled L-shaped cross section defining an integral flat inner mesh leg loosely disposed along side the inner gutter leg unconnected thereto and extending above an uppermost end of the inner gutter leg to beneath the overhang, and having an integral flat upper mesh leg sloping downwardly and outwardly from an upper end of the inner mesh leg over an upper end of the outer gutter leg; and

resilient U-shaped retaining clips each having an inner clip

leg extending through the upper leg of the screen to a position therebeneath and below said inturned portion of the outer gutter leg, a clip base extending outwardly of the inner clip leg, and an outer clip leg extending over the inturned portion from the clip base and along a forward surface of the outer gutter leg and said clip base engaging the upper mesh leg and biasing the upper mesh leg against the gutter inturned portion,

and wherein the gutter is secured to the facia by spikes driven through the inner gutter leg and the outer gutter leg at preselected longitudinal intervals; and

the inner mesh leg is slotted at matching preselected intervals to provide notches having a vertical extent sufficient to allow the inner mesh leg to pass to either side of the spikes and rest at a lower end on the gutter base.

4,888,921

HEADER BAR FOR AWNING STRUCTURE

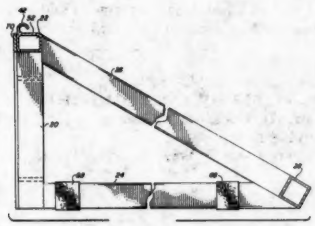
Gaynor P. Markham, 1184 Alden Rd., Orlando, Fla. 32803

Continuation of Ser. No. 794,561, Nov. 4, 1985, Pat. No. 4,768,317. This application Sep. 2, 1988, Ser. No. 240,839

The portion of the term of this patent subsequent to Sep. 6, 2005, has been disclaimed.

Int. Cl.[4] E04B *1/12*

U.S. Cl. 52—63 **5 Claims**



1. A framework for supporting a flexible cover in an awning structure for attachment to a wall of a building, said framework including a header bar comprising:

an elongated member in the form of a rectangular extrusion having a substantially planar rear surface for positioning facing the wall and a substantially planar upper surface, and a C-shape cross-sectioned track protruding from and extending along said upper surface; said track having an end opening through which an enlarged portion of a flexible awning cover may be slid longitudinally along said track, and a longitudinal opening above said upper surface and facing away from said rear surface; said longitudinal opening being adapted and configured to constrain movement of the enlarged portion other than longitudinally along said track.

4,888,922

SETTING HOIST ANCHORS IN POURED CONCRETE STRUCTURES

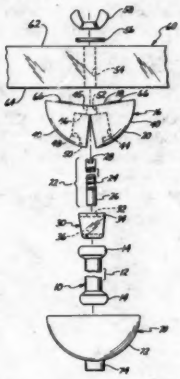
Harry B. Lancelot, Hurst, Tex., assignor to Richmond Screw Anchor Co., Inc., Fort Worth, Tex.

Filed Aug. 15, 1988, Ser. No. 233,089

Int. Cl.[4] E04B *1/38, 1/60*

U.S. Cl. 52—124.2 **26 Claims**

7. In combination, a split hemispherical rubber void of the type including an anchor head receiving cavity for setting hoist anchors having a shaft and an anchor head in poured concrete structure, and a shield of impemeable elastic unitary sheet material fitted over and closely conforming to the hemispherical shape of said body, said shield being apertured to closely pass the shaft of a hoist anchor for sealing the split void



body against entry of fluid concrete into said split or said cavity.

4,888,923

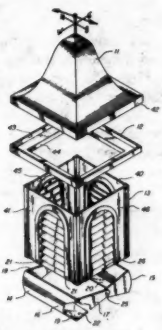
CUPOLA MOUNT

Russell H. Post, Jr., 162 Kingston Rd., Kingston, N.H. 03848

Filed Dec. 10, 1987, Ser. No. 131,013

Int. Cl.[4] E04B *7/18*

U.S. Cl. 52—200 **6 Claims**



1. A cupola assembly mountable on a ridge of a roof comprising:

a hollow rectangular body having two opposing side walls, said first walls hereafter, to be parallel to the line of said ridge, the bottom edges of which when said rectangular body is positioned on said ridge not reaching said roof leaving gaps therebetween, and having two opposing walls, said second walls hereafter, that are to straddle said ridge;

opposed clam shell cylindrical segments the cylindrical portions thereof being coextensive and mating with the bottom edges of said first walls and filling said gaps when the assembly is completed;

a cupola roof extending over all four sides of said hollow rectangular body and having a downturned rim on all four sides:

a connecting rectangular frame having (a) an outer upturned rim mating with the inside of said downturned rim and (b)

a downturned inner rim that mates with the inside top interior edges of said first and second walls;

first means for attaching the cylindrical segments to said roof; and

second means for affixing the cylindrical segments to said rectangular body and preventing relative motion therebetween.

4,888,924

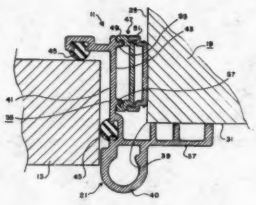
DOOR FRAME EXTENSION ASSEMBLY

Fred A. Grisham, 4130 Bartlett Country Rd., Bartlett, Tenn. 38134, and C. Lynwood Grisham, 9016 Anderton Springs Dr., Memphis, Tenn. 38133

Filed Jan. 31, 1989, Ser. No. 304,424

Int. Cl.[4] E06B *1/04*

U.S. Cl. 52—217 **6 Claims**



1. A door frame assembly for being positioned between the edge of a door and the edge of a door opening in a wall; said assembly comprising:

(a) a door frame member for being attached to the door opening;

(b) shim means for being positioned between said door frame member and said edge of said door opening to reduce the space between said door frame member and said edge of said door; said shim means including a first shim member for being attached to said door frame member and a second shim member for being attached to said first shim member; and

(c) snap means for allowing said first shim member to be snapped onto said door frame member and for allowing said second shim member to be snapped onto said first shim member.

4,888,925

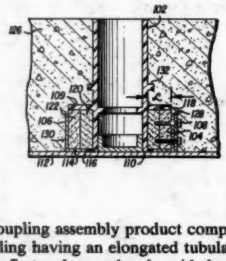
FIRE-RETARDANT FLUID COUPLING ASSEMBLY AND METHOD

Gerold J. Harbeke, 2443 Waterside Cir., Lakeworst, Fla. 33461

Continuation-in-part of Ser. No. 116,174, Nov. 3, 1987. This application Jun. 2, 1988, Ser. No. 201,146

Int. Cl.[4] E04C *1/06*

U.S. Cl. 52—232 **22 Claims**



1. A pipe coupling assembly product comprising:

a pipe coupling having an elongated tubularly-shaped main body with first and second ends, said elongated tubularly-shaped main body having an inner surface and an outer surface, said pipe coupling receiving pipes to be attached thereto at opposite ends;

an intumescent collar wrapped about and rigidly attached to the outer surface of said tubularly-shaped main body near the first end thereof with a corresponding first end edge of said intumescent collar being approximately adjacent said first end of said elongated tubularly-shaped main body, said intumescent collar being constructed of a material which expands when it, the material, gets hot to close off the inner surface of said tubularly-shaped main body;

a closed metallic band-wrapped about and rigidly attached about an outer circumferential periphery of said intumescent collar, said closed metallic band having a heat reception edge extending approximately to the first end of said pipe coupling, said metallic band being comprised of a band of metal having overlapping end portions fastened together by elongated fasteners which extend through said overlapping end portions into the intumescent collar so as to fasten said metallic band to said intumescent collar;

whereby said pipe coupling assembly can be attached to a concrete form with said heat reception edge of said metallic band being protected, concrete can be poured into said form and allowed to cure around said pipe coupling assembly including said closed metallic band and said intumescent collar to form a barrier, and after the form is removed, pipes can be attached to the ends of said pipe coupling to form a fire proof pipe string through said barrier with said heat reception edge of said metallic band being exposed to a space below said barrier.

4,888,926

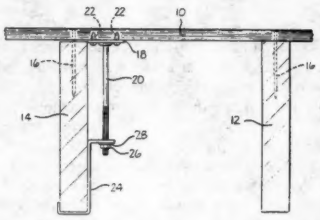
FLOOR SQUEAK ELIMINATOR

Peter J. Lutz, III, Utica, Mich., assignor to E&E Engineering, Inc., Detroit, Mich.

Filed May 8, 1989, Ser. No. 349,322

Int. Cl.[4] E04G *23/00*

U.S. Cl. 52—291 **9 Claims**



9. A squeak eliminator for drawing a floor into contact with a subjacent joist, comprising:

a floor plate assembly comprised of a carriage bolt having a head and a shaft, a first portion of the shaft being of square cross-section and a second portion of the shaft being threaded, the floor plate assembly further including a planar member having a plurality of screw holes therein, said holes configured to permit passage of the shaft of a wood screw therethrough while retaining the head of the screw, said planar member further including an indented portion therein configured to retain the head of the carriage bolt therein and including a square opening therethrough corresponding generally to the square portion of the shaft of the carriage bolt;

a joist strap having a hook portion formed by a first end thereof, said hook portion configured to engage a floor joist, said joist strap further including a second end portion configured to be disposed generally parallel to the floor when the hook portion is engaged with the joist, said

second end including an opening therethrough configured to permit passage of the carriage bolt therethrough; and a nut engageable with the threaded portion of the carriage bolt projecting through the opening in the joist strap, said nut operative in conjunction with the carriage bolt to draw planar member and second end of the joist strap toward one another so as to draw the floor into contact with the subjacent joist.

4,888,927

FLOATING FLOOR

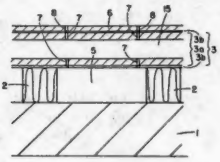
Satoshi Yoshimi, Uji, and Yoichiro Koga, Okayama, both of Japan, assignors to Daiken Trade & Industry Co., Ltd., Toyama, Japan

Filed Jun. 19, 1987, Ser. No. 64,140

Claims priority, application Japan, Jun. 19, 1986, 61-143432; Jul. 23, 1986, 61-173391; Feb. 6, 1987, 62-025765

Int. Cl.[4] E04B *1/86, 5/48*

U.S. Cl. 52—303 **4 Claims**



1. A sound-insulated floatng floor for multistory apartment buildings, comprising a plurality of buffer members arranged in parallel at regular intervals on a structural floor of a multistory apartment building, a plurality of floor panels each having an upper and lower side, said floor panels being arranged side by side on said buffer members to form a floating subfloor and a finish floor laid on said subfloor, said buffer members being of an elastic material such as glass wool or rock wool and forming an air layer between said subfloor and structural floor, each said floor panel having a plurality of cavities and a plurality of air holes, said cavities extending in a direction parallel to longitudinal sides of each said floor panel and being opened at butt ends of said floor panel, said air holes communicating with said cavities and opened at least at the lower side of said floor panel to allow the air in said air layer to flow into and out of said cavities when any floor impact force is applied to the finish floor.

4,888,928

TILE MOUNTING SYSTEM

Philip L. Rea, "Melleray", 7A, Hillcrest Road, Ealing, London W5 2JL, and Stanley R. Bagshaw, 19 Georgewood Road, Hemel Hempstead, Hertfordshire HP3 8AL, both of England

Continuation of Ser. No. 873,346, Jun. 12, 1986, Pat. No. 4,761,926. This application Mar. 9, 1988, Ser. No. 165,917

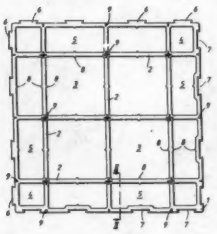
Claims priority, application United Kingdom, Jun. 12, 1985, 8515769

The portion of the term of this patent subsequent to Aug. 9, 2005, has been disclaimed.

Int. Cl.[4] E04F *13/08*

U.S. Cl. 52—387 **1 Claim**

1. A tiling system which comprises the provision of a first matrix for use in tiling, the first matrix defining an apertured portion for adhesive attachment to a surface to be tiled, the apertures constituting a major portion of the area of the first matrix, the apertured portion being provided with a pattern of projections, the sizes and positions of the projections enabling tiles to be fit between the projections, the projections of the patterns being detachably secured to the apertured portion, the configuration of the apertured portion being symmetrical, the configuration having at least one central aperture, a plurality of lateral apertures, and a plurality of corner apertures, the lateral apertures and the corner apertures surrounding the central aperture, combined matrix being formed when the first matrix is attached and aligned along a common edge to a second matrix, the second matrix being identical to the first matrix, the configuration of the combined matrix being similar



to the configuration of the first matrix, a lateral aperture of the first matrix combining with a lateral aperture of the second matrix along the common edge to form a central aperture, and a corner aperture of the first matrix combining with a corner aperture of the second matrix along the common edge to form a lateral aperture.

4,888,929

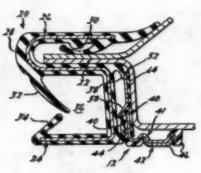
SELF-LOCKING DOOR TRIM FOR FLUSH GLASS

Robert A. Vaughan, Dearborn, and John W. Belser, Northville, both of Mich., assignors to The Standard Products Company, Cleveland, Ohio

Filed Nov. 9, 1988, Ser. No. 269,131

Int. Cl.[4] B60J *1/02*

U.S. Cl. 52—400 **14 Claims**



1. A system for attaching automotive trim to a vehicle door comprising:

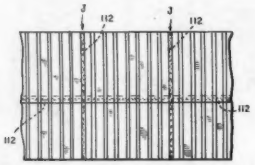
weather stripping adapted to be secured on a flange of the vehicle door, said weather stripping having means adapted for receiving a movable window, means for retaining said weather stripping on the door flange and means for sealing said weather stripping with the vehicle door; and

an automotive trim strip having a reinforcement member with an overall L shape, one leg of said L-shaped member including means for retaining said automotive trim strip on the vehicle door and said leg being rigid and adapted to be forced between said weather stripping and said vehicle door to be retained by said weather stripping, said trim strip retaining means couples with said weather stripping sealing means for retaining said automotive trim strip on the vehicle door.

4,888,930
SEALED ROOF DECK WIND VACUUM TRANSFER SYSTEM

Thomas L. Kelly, 31 Sands St., Waterbury, Conn. 06723

Filed Nov. 19, 1987, Ser. No. 122,443
Int. Cl.[4] E04B 5/00
U.S. Cl. 52—410 30 Claims



1. A roofing assembly for a building roof or the like, comprising:

roof-support structure means;

air permeable deck means overlying and supported on the roof-support means, said deck means including a plurality of separate roof deck panels which overlap or abut at deck joints along their respective edge portions when assembled;

insulation board means supported on top of the roof deck panels;

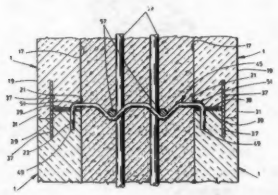
flexible water-tight membrane means overlying the insulation board means; and

deck sealing means for sealing all areas of the deck means, said deck sealing means including means for sealing all abutting or overlapping joints between the roof deck panels and means for sealing all perimeters and penetration sections so as to form an air-tight seal at the deck means between the respective areas above and below the deck means to thereby effect the transfer of wind uplift forces to the deck means.

4,888,931
INSULATING FORMWORK FOR CASTING A CONCRETE WALL

Serge Meilleur, 501 Dominique, Ste Julie de Verchères, Quebec, Canada J0L 2S0

Filed Dec. 16, 1988, Ser. No. 285,411
Int. Cl.[4] E04B 1/00
U.S. Cl. 52—426 10 Claims



1. A concrete-wall formwork comprising:

a pair of formwork sidewalls each formed of a plurality of stacked horizontal rows of coplanar panels;

each panel being made of foamed plastic material and having flat inner and outer faces, upper and lower horizontal edges and vertical end edges, and including longitudinal coplanar slits extending lengthwise of said upper and lower edges parallel to said inner and outer faces, a first rabbit opening onto said inner face and onto said lower edge, and a tongue along one of said vertical end edges and a groove along the other vertical end edge, said tongue-and-groove being sized to cooperate, respectively, with a groove and a tongue of like adjoining coplanar panels to form tongue-and-groove joints therewith;

said panels abutting one another along said horizontal and vertical edges;

wherein ledges and second rabbets of adjoining panels operatively cooperate to form horizontal lap joints;

wherein tongues and grooves of adjoining panels operatively cooperate to form vertical tongue-and-groove joints spaced horizontally along said formwork sidewalls;

wherein longitudinal slits of adjoining panels comprise upward slits in coplanar alignment with downward slits;

a first group of angle-irons having vertical branches, fitting into said upward slits, and horizontal branches with holes therethrough; said horizontal branches extending toward the inner faces of said panels;

a second group of angle-irons having vertical branches, fitting into said downward slits, and horizontal branches with holes therethrough; said horizontal branches extending toward the inner faces of said panels;

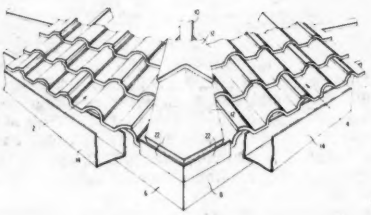
wherein said horizontal branches overlap one another with said holes in register; and

tie-rods having a central portion located between said sidewalls and bent end portions extending through said registering holes and extending int the upper edges of said panels, and elbows between said portions fitting into said first rabbets.

4,888,932
METHOD OF MOUNTING OF TILES AT THE HIP OF A ROOF

Winston Beare, 40 Epping Street, Kyneton, Victoria, 3444, Australia

Filed May 23, 1989, Ser. No. 355,703
Int. Cl.[4] F04B 7/02
U.S. Cl. 52—748 4 Claims



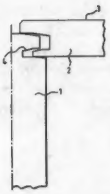
1. In the construction of a tiled roof, a method of forming a hip joint at the bottom corner of a hip defined between two roof sections facing in different directions, said method comprising the steps of providing a tray having body portions each of which lies in the plane of a respective one of the two roof sections, with each body portion having means for positively supporting an adjacent corner tile of the roof section, fastening the tray to the structure of the roof with the tray lying in the zone of the bottom corner of the hip, applying roofing tiles to the roof with the two corner tiles at the bottom corner being supported on the respective body portions of the tray and retained by the supporting means of the tray against downwards movement, and securing hip tiles over the roofing tiles.

4,888,933

STRUCTURAL PANEL

Edgar Guomundsson, Vesturbergi 49, and Oli J. Asmundsson, Depluholum 6, both of Reyjavik, Iceland

Filed Apr. 10, 1981, Ser. No. 252,935
Claims priority, application Iceland, May 7, 1980, 8015170
Int. Cl.[4] E04B 2/70
U.S. Cl. 52—779 4 Claims



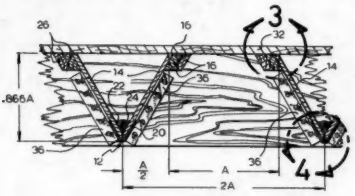
1. A structural panel comprising a structural post together with a surface-board, where the structural post is located along the edge of the board, and the bearing direction of the structural post is perpendicular to the plane of the board, and is characterized by a transverse groove on the structural post and board, where the joining direction of the transverse grooves lies in the plane of the board and perpendicular to the joint when the grooves are frictionally grippingly engaged such that the units are joined necessarily and sufficiently to form a bearing whole, a structural panel, without nailing, and can thus with ease and without professional skill be snapped together, characterized by a triple elastic transverse groove including two contact surfaces on the tongue, these surfaces not being located opposite each other, and opposite each of these contact surfaces a corresponding contact surface in the groove, and in addition a third contact surface, not located opposite the nearer of the former two, and opposite to this third contact surface a corresponding contact surface on the other unit.

4,888,934

BEAM STRUCTURE

Raymond Couture, 30 des Frênes Street, Bromont, Canada J0E 1L0

Filed Feb. 5, 1988, Ser. No. 152,461
Int. Cl.[4] E04C 1/32
U.S. Cl. 52—807 7 Claims



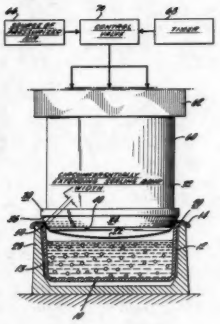
1. A beam structure for supporting a floor or roof, of V-shape cross-section, defining an apex and two side wings, said side wings formed of substantially imperforate flat panels consisting of wood wafer boards and having top and bottom longitudinal edges and joined together at their bottom edges to form said apex, said bottom edges forming bottom bevelled edge faces located opposite each other and constituting a butt joint, a coating of synthetic resin adhering to and joining said panels at said apex, said coating resin extending between and coating said bottom bevelled edge faces of said panels and bridging and coating marginal areas of the inside and outside faces of said panels at said apex, and narrow strips secured to any of said faces of each panel adjacent its top longitudinal edge.

4,888,935

METHOD FOR SEALING A LID TO A CONTAINER

Willem Wythoff, Medford, N.J., assignor to Campbell Soup Company, Camden, N.J.

Filed Jul. 25, 1988, Ser. No. 224,762
Int. Cl.[4] B65B 7/28, 51/10
U.S. Cl. 53—478 4 Claims



1. The method of sealing to the open top of a plastic container a dished heat-conductive lid extending across and against said open top of said container with the dished portion of said lid extending inward of said container, said top of said container having a top inner edge portion which is convex upwardly and inwardly of said container, said method comprising:

inserting into said dished portion the tip of a hot heat-sealing tool to contact selectively only the area of said lid overlying said convex inner edge portion of said container, thereby to soften the underlying plastic material only at said convex inner edge, and thereafter removing said tool to permit resolidification of said plastic material and consequent formation of a seal between said inner edge and said lid;

wherein said tip of said tool is tapered inwardly and has a cross-section geometrically similar to the shape of the innermost circumference of said inner edge portion, the diameter of said tip and the angle of its inward taper being such that the outer side surface of said tip contacts only said area of said lid overlying said convex inner edge portion of said container, substantially tangentially along a line of contact therewith; and

wherein said tool is inserted with sufficient force to press said lid against said inner edge portion of said top of said container to provide direct contact between said tool tip and said lid and between said lid and only said inner edge portion during said heating by said tool;

whereby said seal between said lid and said inner edge portion of said top of said container, after said resolidification, extends completely around said inner edge portion and is confined to a narrow line region, said lid therefore being susceptible of easy removal when desired.

4,888,936

APPARATUS FOR PRODUCING BOTTLED BEVERAGES

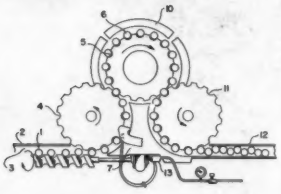
Tsutomu Takehana, Kouriyama; Tetsuo Kouzai, Kouriyama; Masaaki Sagara, Kouriyama; Tamio Yaginuma, Kouriyama, and Teruji Sasaki, Kouriyama, all of Japan, assignors to The Coca-Cola Company, Atlanta, Ga.

Division of Ser. No. 215,773, Jul. 6, 1988, Pat. No. 4,840,014, which is a continuation-in-part of Ser. No. 935,855, Nov. 28, 1986, abandoned. This application Jan. 27, 1989, Ser. No. 302,458

Claims priority, application Japan, Nov. 28, 1985, 60-266238

Int. Cl.[4] B65B *31/06*

U.S. Cl. 53—510 1 Claim



1. An apparatus for continuously producing bottled beverages and closing bottles with caps, each bottle having an externally threaded mouth and having been charged with a liquid for drinking, said apparatus comprising:

a timing screw for advancing bottles continuously at fixed spatial intervals, each bottle having an externally threaded mouth and having been charged with a liquid product for drinking;

an inlet star wheel having a plurality of recesses at the periphery thereof at fixed spatial intervals, said recesses being adapted to receive bottles with externally threaded mouths that have been conveyed by said timing screw;

a cap release for applying caps onto the threaded mouths of bottles;

a nozzle for ejecting a stream of non-oxidizing gas into each bottle with the nozzle being situated immediately ahead of the cap release;

a capper having a plurality of recesses at the periphery thereof at fixed spatial intervals, said recesses being adapted to receive bottles with externally threaded mouths to which caps have been applied, said capper being adapted to close the threaded mouths of bottles with the caps while bottles with the threaded mouths are being shifted in place in the recesses; and

an outlet star wheel having a plurality of recesses at the periphery thereof at fixed spatial intervals, said recesses being adapted to receive bottles with the threaded mouths from the capper with the externally threaded mouths closed with the caps;

wherein the nozzle is connected with a rotary valve connected with the timing screw, and the rotary valve forms a flow channel for the non-oxidizing gas each time the rotor makes a rotation, whereby a jet of non-oxidizing gas from the nozzle is ejected intermittently at fixed time intervals in accordance with the periodical rotation of the rotary valve associated with the periodical rotation of the timing screw.

4,888,937

APPARATUS FOR BAGGING HAY BALES

Willis H. Glenn, Olin, Iowa 52320

Filed Jan. 20, 1984, Ser. No. 572,538

Int. Cl.[4] B65B *9/10, 43/42*

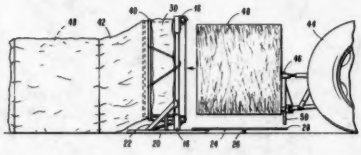
U.S. Cl. 53—567 12 Claims

10. In combination with a movable vehicle including means for lifting and carrying a large preformed bale extended from the vehicle, said vehicle having a towing attachment adjacent said lifting and carrying means; an improved apparatus for use in covering large preformed bales by placing them inside of a tube of flexible weather-resistant material, said apparatus comprising

a supporting frame,

ground engaging means on the lower end of said frame to provide for towing of said frame along the ground, said ground engaging means having a forward end and a rearward end,

a ring-like member supported by the frame with the axis of said member approximately horizontal for insertion of such bales therethrough, said member being engageable with the open end of such a tube of material for supporting said tube therearound, said frame and ring-like member disposed and designed to permit a bale to be extended



through said member while so carried by such a vehicle for at least the distal end of the bale to be deposited through said member into the tube and resting on the subtending tube material on the ground and thereby anchoring said tube material,

and towing means disposed adjacent one side of said ring-like member for convenient engagement with said towing attachment to provide for towing of the apparatus by said vehicle following placement of each said bale in said tube by said vehicle so that additional tube material will be removed from said ring-like member as said ring-like member is towed and an additional length of said material will be extended therefrom to receive another bale and for disengagement from said towing attachment for said vehicle to lift and deposit another bale therein.

4,888,938

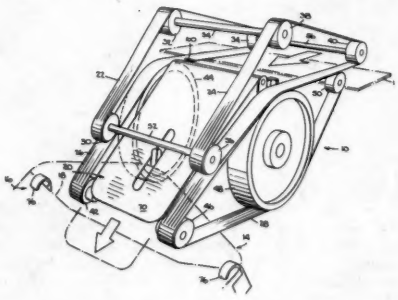
ENVELOPE THROAT OPENING BLADE

David R. Auerbach, West Redding, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 30, 1988, Ser. No. 292,133

Int. Cl.[4] B65B *5/06, 39/12, 43/26*

U.S. Cl. 53—569 10 Claims



1. Apparatus for inserting documents into an envelope, comprising:

a housing frame;

a constantly turning roller rotatably mounted to said frame;

a lower, rotatable belt mounted to said frame and trained over said roller, said lower belt having an upper reach;

an upper, rotatable belt mounted to said frame, said upper belt having a lower reach engagable with the upper reach of the lower belt to transport said documents;

means for separating the front wall from the back wall of the envelope, said means located on the downstream side of said upper and lower belts;

an envelope throat opening blade mounted to said frame on the downstream side of said upper and lower belts; and

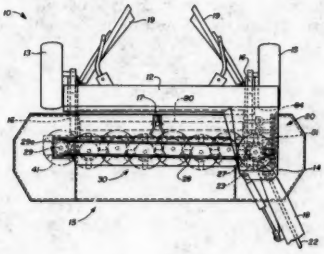
a pivotable trigger cam connected to said blade and engagable with said constantly turning roller and said documents, whereby when the documents engage said cam, said roller is engaged by said cam to thereby drive said opening blade into the throat of the envelope.

4,888,939

BELT DRIVEN DISC CUTTERBAR

Jack W. Crane, New Holland, Pa., assignor to Ford New Holland, Inc., New Holland, Pa.

Filed Sep. 2, 1988, Ser. No. 240,863
Int. Cl.[4] A01D *34/66*
U.S. Cl. 56—13.6 **21 Claims**



1. In a disc mower-conditioner having a frame; a disc cutterbar supported from said frame for engagement with standing crop material to effect a severing thereof, said disc cutterbar including a hollow transmission casing rotatably supporting a plurality of disc cutters above an upper surface thereof, each said disc cutter having at least one knife connected thereto and rotatable therewith to sever standing crop material by impact action, said disc cutterbar further including a drive transmission means within said casing and engageable with said disc cutters; conditioning means supported by said frame rearwardly of said disc cutterbar to receive severed crop material for conditioning thereof; and drive means operably associated with said drive transmission means to provide rotational power thereto, an improved disc cutterbar comprising:

said disc cutters being mounted on said transmission casing so that the axis of rotation of alternating disc cutters is oriented obliquely with respect to the axis of rotation of immediately adjacent disc cutters, said obliquely mounted disc cutters being mounted on said transmission casing forwardly of the adjacent disc cutters; and

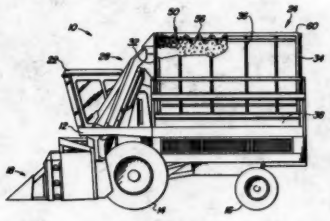
said drive transmission means including a drive belt drivingly engaged with a drive sheave affixed to each said disc cutter, the drive sheaves associated with said obliquely mounted disc cutters being positioned forwardly of the drive sheaves associated with the disc cutters immediately adjacent thereto.

4,888,940

METHOD AND APPARATUS FOR COMPACTING COTTON WITHIN A COTTON HARVESTER BASKET

Timothy A. Deutsch, Newton, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Jan. 27, 1989, Ser. No. 302,648
Int. Cl.[4] A01D *46/22;* B60P *1/42*
U.S. Cl. 56—16.6 **19 Claims**



7. In a cotton harvester having an unloadable basket with opposed sidewalls including first and second opposed walls extending upwardly from a floor, a cotton conveying duct opening toward the second wall for blowing harvested cotton toward the second wall, rotatable compacting structure extending between the first and second walls, and means for rotating the compacting structure in a first direction during initial filling of the cotton basket to move the cotton toward one of the opposed walls, and means for reversing the rotational direction of the compacting structure to urge the cotton toward the other of said opposed walls during final filling of the basket.

17. A method of filling a cotton basket on a cotton harvester, including the steps of:

(a) blowing the cotton in a preselected direction into the basket;

(b) rotating a compacting auger in the basket to move the cotton in a direction opposite the preselected direction until the cotton is substantially compacted in said direction opposite the preselected direction; and

(c) after step (b), reversing the direction of rotation of the compacting auger to compress the cotton in the preselected direction.

4,888,941

FRUIT HARVESTING MACHINE

Curtis E. Gerber, 4015-8C Bayshore Blvd., Tampa, Fla. 33611

Filed Feb. 6, 1989, Ser. No. 306,080
Int. Cl.[4] A01D *46/00;* E04G *1/20*
U.S. Cl. 56—328.1 **10 Claims**

1. A fruit harvesting machine for harvesting fruit from fruit trees, comprising in combination:

a transport mechanism;

an axle connected transversely to a lower portion of said transport mechanism;

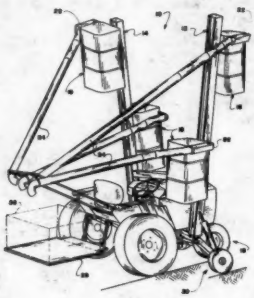
a cross beam connected transversely to an upper portion of said transport mechanism, said cross beam including a pair of extensible members extending from both ends thereof;

a pair of booms positioned on opposing sides of said transport mechanism;

first means for pivotably connecting a lower end of each said booms to respective ends of said axle;

second means for pivotably connecting an end of said extensible members of said extensible member to a middle portion of respective said booms, whereby, extension of said

extensible member causes tilting of said boom about said first pivot means;



at least one man supporting basket slideably mounted to each said boom; and

means for lifting said basket along the respective said boom.

4,888,942

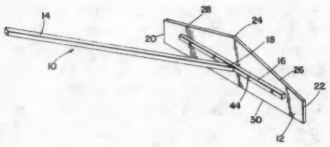
LABOR SAVING LAWN IMPLEMENT

Anthony Monaco, 7320 Liberty Rd., Solon, Ohio 44139

Filed May 18, 1988, Ser. No. 195,515

Int. Cl.[4] A01D *11/00*

U.S. Cl. 56—400.01 **11 Claims**



1. A lawn implement for working fallen leaves comprising: a blade having a front planar surface, a mid-portion, end portions, a bottom edge and a top edge; a center of maximum resistance and a center of maximum effort; and a handle secured to the back surface of said blade substantially midway between said bottom and top edges and forming a compound angle with said blade when said bottom edge of said blade is in the horizontal position and said blade is in the vertical position, comprising a right angle with the blade when viewed horizontally and comprising an acute angle with said blade when viewed vertically, to facilitate manual pushing of said blade with said handle against fallen leaves; said mid-portion of said blade being adapted to be the center of maximum resistance; the center of maximum effort of said blade being in alignment with said center of maximum resistance; said handle being axially aligned with both of said centers; said blade comprising a straight horizontal bottom edge; vertical left and right outboard side edges of equal length; a left top edge extending from said left outboard edge inwardly and upwardly toward the center of said blade; and a right top edge extending from said right outward edge inwardly and upwardly toward the center of said blade to intersect said left top edge at the vertical centerline of said blade, whereby a pile of leaves may be moved by said blade.

4,888,943

APPARATUS FOR LOOSENING AND UNRAVELLING A YARN

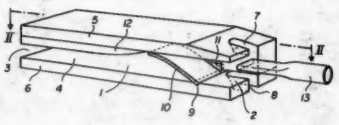
Rémi Cottenceau, Viry, France, and Erwin Zürcher, Le Lignon, Switzerland, assignors to Mesdan S.p.A., Salo, Italy

Continuation of Ser. No. 154,039, Feb. 9, 1988, Pat. No. 4,829,759. This application Feb. 8, 1989, Ser. No. 307,521

Claims priority, application Switzerland, Feb. 20, 1987, 653/87

Int. Cl.[4] D01H *15/00*

U.S. Cl. 57—22 **7 Claims**



1. A device for loosening and unravelling a textile yarn comprising:

a duct having an air flow introduction end and an air flow exit end, said duct having a slotted opening along one side wall;

modulating means for modulating an air flow along said duct; and

yarn introduction means for introducing a yarn into said duct;

said modulating means causing the introduced yarn to be subjected to pulsed air while within said duct, thereby causing the introduced yarn to be loosened and unravelled.

4,888,944

PROCESS AND APPARATUS FOR PRODUCTION AND QUALITY CONTROL IN MULTI-SPINDLE TEXTILE MACHINES

Ernst Felix, Uster, Switzerland, assignor to Zellweger Uster AG, Uster, Switzerland

Filed Mar. 18, 1988, Ser. No. 170,410

Claims priority, application Switzerland, Mar. 19, 1987, 01042/87

Int. Cl.[4] D01H *13/26, 13/44, 13/22*

U.S. Cl. 57—264 **22 Claims**

1. A process for production and quality control of production units in multi-spindle textile machines in which the production units are arranged in a row and the thread at each production unit executes a transverse movement in the form of a balloon to enclose a rotationally symmetrical space, characterized in that a group of at least two of said production units is monitored in common by a light beam passed sequentially through the rotationally symmetrical spaces associated with the balloons formed by the threads in all the production units of said group, in that the light beam is intermittently interrupted or attenuated in each of the rotationally symmetrical spaces by the moving thread therein, and in that the shading thereby produced is converted into an electric signal for evaluation to provide an indication of at least one parameter associated with the threads of said production units.

9. Apparatus for production and quality control of production units in multi-spindle textile machines in which the production units are arranged in a row and the thread at each

production unit executes a transverse movement in the form of a balloon to enclose a rotationally symmetrical space, said apparatus comprising a monitoring system for monitoring in common the production units of a group containing at least two of said production units, said monitoring system including a transmitter for a light beam and a receiver for such beam so arranged that the beam passes through said rotationally symmetrical spaces formed at all said production units of said group, and means for evaluating the fluctuations in intensity of the beam occurring at the receiver.

4,888,945

METHOD FOR QUALITY CONTROL OF TEXTURED YARN

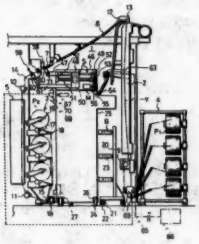
Yoshiyasu Maeda, Yamatokooriyama; Yasuhiro Inoue, Settsu; Toshiyuki Uno, Kusatsu, and Kazuyoshi Suzuki, Nara, all of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Mar. 25, 1988, Ser. No. 173,354

Claims priority, application Japan, Apr. 3, 1987, 62-82526; Apr. 14, 1987, 62-91126; Apr. 14, 1987, 62-91125; Apr. 22, 1987, 62-99449; Apr. 22, 1987, 62-99448; Sep. 10, 1987, 62-227107

Int. Cl.[4] D01H *13/14, 13/22, 13/26*

U.S. Cl. 57—264 **26 Claims**



1. In a false twister having a plurality of take-up motions, a method for quality control of textured yarn comprising the steps of:

conducting quality measurement of yarn upon doffing in said take-up motions at a first point where said yarn is being twisted and a second point where said yarn is being untwisted to provide readings of quality measurement by means of a quality measuring device; and

analyzing a combination of said readings at said first and second points in a quality control unit.

4,888,946

ROVING FRAME APPARATUS FOR REMOVING BOBBINS AND REPLACING REMOVED BOBBINS WITH EMPTY TUBES

Pietro B. Marzioli, Via Durante, 1-25036 Palazzolo sull'Oglio Brescia, Italy

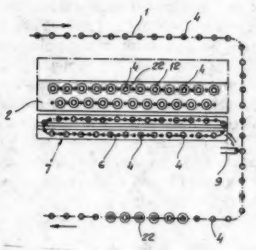
Filed Sep. 16, 1988, Ser. No. 245,736

Claims priority, application Italy, Oct. 2, 1987, 22134 A/87

Int. Cl.[4] D01H *9/04, 9/10, 9/18*

U.S. Cl. 57—267 **5 Claims**

1. An apparatus for removing bobbins from a roving frame and replacing removed bobbins with empty tubes, comprising a first conveyor belt, extending along perimetrical sides of said roving frame, with said first conveyor belt a second conveyor belt, a doffing carriage and an operating board cooperating, said second conveyor belt, doffing carriage and operating board being controlled to transfer said empty tubes to said roving frame and bobbins from said roving frame to said first conveyor belt, said first conveyor belt being provided with evenly spaced gripping devices for gripping corresponding tube elements having a respective bottom flange, said second conveyor belt comprising two parallel legs having end portions coupled by semicircular portions, and being mounted on a respective supporting frame adapted to slide downward and upward on vertical guides, said second conveyor belt bearing a plurality of said evenly spaced gripping devices, said operating board, arranged at the front of said roving frame, enclosing, through a tiltable wing, two rows of pin members spaced with a distance which corresponds to a half of the distance separating two said gripping devices of said second conveyor belt, said apparatus further comprising an arm member adapted



to transfer said empty tubes from said first conveyor belt to said second conveyor belt and said bobbins, formed on said roving frame, from said second conveyor belt to said first conveyor belt, said arm member being displaced along a longitudinal axis by a horizontal cylinder and, upward and downward by a vertical cylinder, said arm member rotatively reciprocating about a vertical axis so as to displace one end thereof, provided with a pin member for engaging said empty tubes, from said first conveyor belt to said second conveyor belt and then from said second conveyor belt to said first conveyor belt.

4,888,947

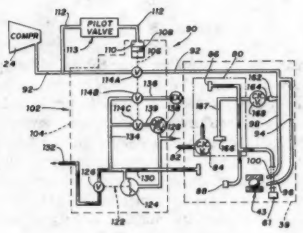
SECONDARY OIL SYSTEM

Douglas K. Thompson, Speedway, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 31, 1988, Ser. No. 264,576

Int. Cl.[4] F02C *7/06*

U.S. Cl. 60—39.08 **4 Claims**



1. In a gas turbine engine having a source of compressed air, a rotor bearing in a bearing sump of said engine, a primary oil system for lubricating said bearing including an oil reservoir tank in said sump filled by said primary oil system during normal engine operation, and a source of fuel under pressure

a secondary oil system comprising:

a secondary oil system air circuit between said compressed air source and said bearing sump including a mist circuit portion,

a mist nozzle having a tip exposed to airflow in said mist circuit portion whereby a low pressure zone is defined at said tip during airflow through said mist circuit portion,

a secondary oil pickup between said reservoir tank and said

mist nozzle for conducting oil from said reservoir tank to said low pressure zone at said mist nozzle tip,

a secondary oil system air valve in said secondary oil system air circuit having a valve element normally disposed in a retracted position blocking said secondary oil system air circuit and movable by air pressure in a pilot pressure chamber of said secondary oil system air valve from said retracted position to an extended position unblocking said secondary oil system air circuit,

a pilot pressure circuit between said compressed air source and said pilot pressure chamber, and

a pilot valve disposed in said pilot pressure circuit having a first element responsive to fuel pressure in said fuel system blocking said pilot pressure circuit only when fuel pressure is below a magnitude corresponding to engine idle conditions and a second element responsive to primary oil pressure blocking said pilot pressure circuit only when primary oil pressure is above a magnitude corresponding to engine idle conditions whereby said pilot pressure circuit is unblocked only when fuel pressure is above said engine idle magnitude and primary oil pressure is below said engine idle magnitude.

4,888,948

MONITORING OF FOREIGN OBJECT INGESTION IN ENGINES

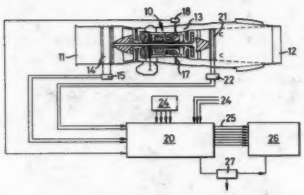
Celia E. Fisher, Southampton, and Roy Forfitt, Whiteparish, both of United Kingdom, assignors to Stewart Hughes Limited, United Kingdom

Filed Mar. 22, 1988, Ser. No. 171,683

Claims priority, application United Kingdom, Mar. 25, 1987, 8707187

Int. Cl.[4] F02C 7/05

U.S. Cl. 60—223 **9 Claims**



1. An apparatus for monitoring the intake of foreign bodies into a gas turbine engine, the apparatus comprising:

at least one sensor located at or near the intake of an engine, said at least one sensor being effective to sense the passage of electrostatic charge associated with said foreign bodies adjacent said at least one sensor and for producing a signal indicative of the passage of said electrostatic charge; and

signal conditioning means coupled to said at least one sensor and effective for conditioning said signal produced by said at least one sensor

---

4,888,949

PROPULSION SYSTEM FOR A SMALL VEHICLE

Roy K. Rogers, 26575 Barns, Roseville, Mich. 48066

Filed Jul. 18, 1988, Ser. No. 182,541

Int. Cl.[4] F16D 31/02

U.S. Cl. 60—434 **10 Claims**

1. A propulsion system for supplying power to a driven wheel of a vehicle comprising:

an engine;

a drive shaft extending from the engine;

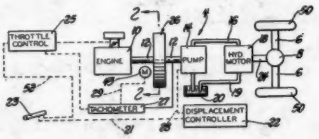
a hydraulic circuit including a pump connected to the drive shaft, whereby the engine drives the pump;

means for varying the volume of fluid displaced by the pump per revolution of the drive shaft;

a hydraulic motor in the circuit driven by the pump;

an output shaft extending from the hydraulic motor for engagement with a driven wheel of a vehicle;

a flywheel mounted on the drive shaft having weights radially slideable toward or away from the center of the flywheel;



a flywheel regulator means for controlling the radial position of the weights with respect to the flywheel wherein the flywheel regulator means translates the weights radially inwardly when the drive shaft speed is below a selected value and translates the weights outwardly when the drive shaft speed exceeds the selected value;

an engine regulator means for normally maintaining the drive shaft speed between upper and lower limits, said lower limit exceeding the selected value to which the flywheel regulator responds.

4,888,950

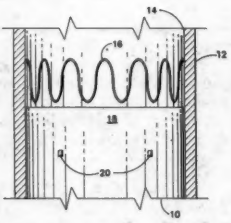
MAGNETIC DRIVEN HYDRODYNAMIC LUBRICATION SYSTEM FOR FREE PISTON STIRLING ENGINE

William T. Beale, Athens, Ohio, assignor to Sunpower, Inc., Athens, Ohio

Filed Jun. 26, 1989, Ser. No. 371,278

Int. Cl.[4] F02G 1/04

U.S. Cl. 60—520 **14 Claims**



1. In a free piston Stirling engine having a power piston and a displacer piston in which each reciprocate in a cooperating, coaxial cylinder, at least one of the pistons being hydrodynamically lubricated between the interfacing surfaces of the piston and the cylinder by spinning the piston about its axis, the improved means for spinning the piston comprising:

(a) a first magnetic article mounted to one of the interfacing surfaces; and

(b) a magnetic material track positioned to include a series of segments in alternately inclined, opposite oblique directions around a central axis along at least part of the other interfacing surface;

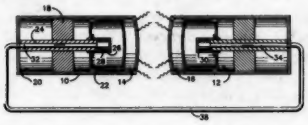
wherein the first magnetic article and the magnetic material track, when in sufficient proximity during reciprocation, apply equal and opposite forces upon each other to create a torque which spins the reciprocating piston about its axis.

4,888,951

PHASE SYNCHRONIZATION AND VIBRATION CANCELLATION FOR FREE PISTON STIRLING MACHINES

William T. Beale, Athens, Ohio, assignor to Sunpower, Inc., Athens, Ohio

Filed Jul. 3, 1989, Ser. No. 376,231
Int. Cl.[4] F02G *1/04, 1/06*
U.S. Cl. 60—520 12 Claims



1. An improvement for synchronizing the phase of a pair of free piston Stirling machines designed to operate at the same frequency, each Stirling machine including at least one chamber confining a gas operating as a spring and acting upon a reciprocating component of its machine, wherein the improvement comprises:

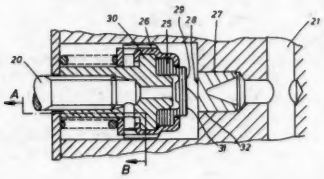
a sonic waveguide connected between said chambers, having a sonic wavelength which is sufficiently greater than an insubstantial fraction of a wavelength at said frequency to permit a standing wave to be set up in the waveguide during operation.

4,888,952

RE-ASPIRATION VALVE FOR MASTER BRAKE CYLINDERS

Wilhelm Zirps, Hemmingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed May 10, 1988, Ser. No. 192,095
Claims priority, application Fed. Rep. of Germany, May 21, 1987, 3717090
Int. Cl.[4] B60T *11/28;* F15B *7/08*
U.S. Cl. 60—589 20 Claims



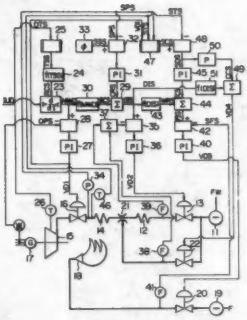
1. A master brake cylinder including a re-aspiration valve including a brake fluid container, said re-aspiration valve is embodied as a central valve in a piston and includes a valve shaft, an elastic sealing body mounted on said valve shaft and being operative within a work chamber and permits fluid flow to said fluid container, said re-aspiration valve (10, 11) includes a valve seat at least partly embodied by a porous body (27, 34) that is permeable to the brake fluid, and is in permanent hydraulic communication with said brake fluid container.

4,888,953

APPARATUS FOR CONTROLLING BOILER/TURBINE PLANT

Yukio Fukayama; Taku Oshima, and Shigeyoshi Kawano, all of Kure, Japan, assignors to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 10, 1988, Ser. No. 269,899
Claims priority, application Japan, Nov. 13, 1987, 62-286900; Oct. 13, 1988, 63-256001
Int. Cl.[4] F01K *13/02*
U.S. Cl. 60—657 5 Claims



1. A boiler/turbine plant controlling apparatus comprising:

means for driving a turbine inlet steam flow regulator valve on the basis of a difference between a load command signal and an actually measured output signal of a plant;

means for driving a boiler feed water flow regulator valve on the basis of a difference between a value which is obtained by adding a boiler feed water amount with a super heater feed water amount and a value represented by a boiler input command signal;

means for driving a fuel flow regulator valve in accordance with an actually measured fuel amount and a fuel command signal corrected by a difference between a primary steam temperature setting signal and a steam temperature signal representative of a primary steam temperature measured value; and

means for driving a super heater water feed valve on the basis of a difference between the primary steam temperature setting value and the steam temperature signal representative of the primary steam temperature measured value;

wherein the improvement comprises:

means for calculating a steam temperature drop between an inlet of said steam flow regulator valve disposed at an inlet of the steam turbine and an inlet of a blade row of said steam turbine on the basis of an opening degree of said steam regulator valve and a temperature and a pressure of steam at the inlet of said steam flow regulator valve; and

means for correcting said primary steam temperature setting value on the basis of the calculated value of said calculating means.

4,888,954

METHOD FOR HEAT RATE IMPROVEMENT IN PARTIAL-ARC STEAM TURBINE

George J. Silvestri, Jr., Winter Park, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

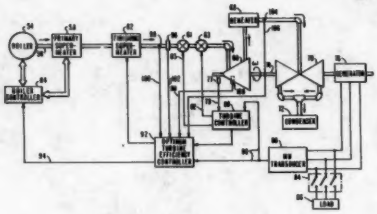
Filed Mar. 30, 1989, Ser. No. 330,407
Int. Cl.[4] F01K *13/02*
U.S. Cl. 60—660 5 Claims

1. A method for reducing shock loading of control stage blading in a partial-arc steam turbine in which steam supply is controlled to match power demand, the turbine including a

plurality of control valves each arranged for admitting steam to a predetermined arc of admission at the control stage blading, the method comprising the steps of:

sequentially closing selected ones of the control valves to reduce the arc of admission to the minimum value permissible at full operating steam pressure;

generally decreasing pressure to a value such that the pressure drop across the first control stage at a selected further



reduced arc of admission does not exceed the pressure drop at the minimum value of admission arc with designed throttle pressure;

closing additional selected ones of the control valves to reduce the arc of admission to the selected further reduced arc; and

further decreasing steam pressure to maintain turbine power at the demand value.

4,888,955

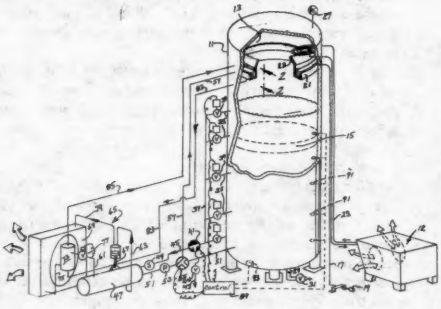
TWO PHASE CO_2 STORAGE TANK

Lewis Tyree, Jr., Lexington, Va.; Roger F. Gyger, Naperville, and George D. Rhoades, La Grange, both of Ill., assignors to Liquid Carbonic Corporation, Chicago, Ill.

Filed Aug. 23, 1988, Ser. No. 235,298

Int. Cl.[4] F17C *5/02*

U.S. Cl. 62—47.1 **15 Claims**



1. A system for delivering either equilibrium or subcooled liquid carbon dioxide from a single tank, which system comprises

an insulated tank for holding liquid CO_2 to a depth of at least about 6 feet,

inlet means for supplying CO_2 to said tank,

lower outlet means for delivering liquid CO_2 from said tank,

means for condensing CO_2 vapor, which vapor is present in the head section of said tank, to maintain a desired pressure greater than 150 psig at the top of said tank,

heat exchange means,

a mechanical refrigeration type cooling unit including a refrigerant compressor and a refrigerant condenser,

means for withdrawing equilibrium liquid CO_2 from said tank,

means for supplying withdrawn equilibrium CO_2 to said heat exchange means,

means connecting an outlet from said condenser to said heat exchange means so that condensed liquid refrigerant is caused to evaporate and to subcool liquid CO_2 in said heat exchange means,

vapor return means interconnecting a refrigerant vapor outlet and the suction side of said compressor, and

means for returning subcooled liquid CO_2 from said heat exchange means to a bottom region of said tank means in a manner in which said returning liquid remains in said bottom region of said tank means, whereby a reservoir of high pressure, subcooled liquid CO_2 can be established in said bottom region of said tank means below a thermocline above which an upper region of liquid CO_2 can exist which is in equilibrium with CO_2 vapor in said head section, said inlet means for supplying CO_2 being located to deliver CO_2 to the equilibrium region above said thermocline so as not to disrupt such thermocline.

4,888,956

CRYOGENIC APPARATUS AND CRYOGENIC METHODS

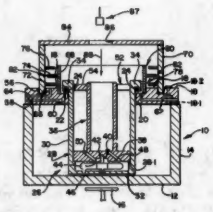
Pieter W. le Roux Murray, Private Bag X41, Pretoria, 0001, South Africa

Filed Jan. 15, 1988, Ser. No. 144,121

Claims priority, application South Africa, Jan. 16, 1987, 87/0318; Sep. 4, 1987, 87/6629

Int. Cl.[4] F25B *19/00*

U.S. Cl. 62—51.1 **19 Claims**



1. Cryogenic apparatus comprising walling bounding an endless canal for containing liquid cryogen, means for continuously circulating liquid cryogen around said canal so that if lows past an entry location, means for introducing a substance to be frozen into the canal at said entry location so that it contacts the cryogen flowing past the entry location and is frozen by it, a bath in which said canal is located, the bath serving to hold a liquid which boils at a temperature below the freezing point of the cryogen in the canal, means for detecting the temperature of the cryogen, and heating means for maintaining the temperature of the cryogen above its freezing point but sufficiently far below its boiling point to prevent boiling occurring when the substance to be frozen is introduced.

4,888,957

SYSTEM AND METHOD FOR REFRIGERATION AND HEATING

Konrad G. Chmielewski, Fort Smith, Ark., assignor to Rheem Manufacturing Company, New York, N.Y.

Filed Sep. 18, 1985, Ser. No. 777,323

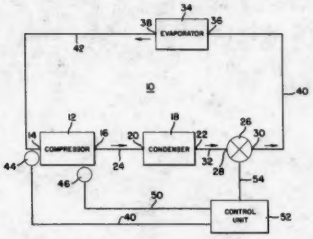
Int. Cl.[4] F25B *31/00*

U.S. Cl. 62—84 **17 Claims**

1. A refrigeration system comprising:

(a) a compressor having an inlet, an oil sump, and an outlet;

(b) a condenser having an outlet, and an inlet connected to said compressor outlet;
(c) an expansion valve operable for controlling refrigerant flow in said system and having an outlet, and an inlet connected to said condenser outlet;
(d) an evaporator having an inlet connected to said expansion valve outlet and an outlet connected to said compressor inlet; and



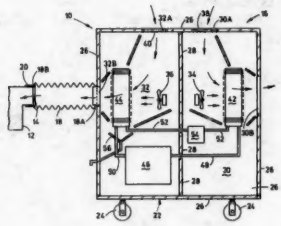
(e) control means for operating said expansion valve to maintain a predetermined relationship between the temperature of oil in said oil sump and the saturated temperature of refrigerant in the vicinity of said compressor inlet, said predetermined relationship effecting a temperature differential providing that solubility of said refrigerant entering said compressor with said oil in said oil sump is less than would occur in the absence of such maintenance of said predetermined relationship.

4,888,958

COOLING APPARATUS FOR LOW AIR LOSS THERAPY BEDS

Gregory R. Ella, 225 S. Jackson, Denver, Colo. 80209

Filed Nov. 30, 1988, Ser. No. 277,792
Int. Cl.[4] F75D *15/00*
U.S. Cl. 62—237 **14 Claims**



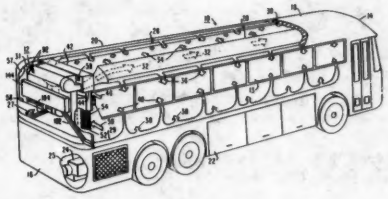
1. An apparatus for cooling a low air loss therapy bed having an intake manifold with an inlet, said apparatus comprising:
(a) a cooling unit for generating a flow of cool air;
(b) a flexible conduit connected to the cooling unit for routing the flow of cool air from said cooling unit; and
(c) an adapter releasably connectible to the intake manifold of the bed and having first means for allowing passage of a flow of ambient air to the inlet of the manifold and second means coupled to said conduit for communicating the flow of cool air from said conduit to the inlet without obstructing ambient air flow to the inlet via said first means;
(d) said first means of said adapter being a shroud releasably connectible to the manifold and spaced therefrom so as to define an air flow chamber therebetween communicating with the manifold inlet, said shroud also defining an opening communicating with said chamber for entry of ambient air flow into said chamber.

4,888,959

BUS AIR CONDITIONER SUITABLE FOR MOUNTING WITHIN THE NORMAL PROFILE OF A BUS

Ronald W. Brown, New Hope, Minn., assignor to Thermo King Corporation, Minneapolis, Minn.

Filed Feb. 9, 1989, Ser. No. 308,331
Int. Cl.[4] B60H *1/32*
U.S. Cl. 62—244 **11 Claims**



1. A bus air conditioner suitable for mounting within the profile of a bus, comprising:
a bus having a front, back and first and second sides, openings in said back and said first and second sides, and upper and lower air duct distribution systems for receiving conditioned air,
an elongated frame mounted in said bus, immediately adjacent to the back,
said frame defining an evaporator section in an upper portion of the frame, a condenser section in a lower portion of the frame, below said evaporator section, and an air duct which extends downwardly from the evaporator section, through said condenser section,
an evaporator coil in said evaporator section,
first evaporator air delivery means associated with the evaporator section,
second evaporator air delivery means associated with the air duct, below the condenser section,
a condenser coil in said condenser section,
and condenser air delivery means associated with said condenser section,
said condenser air delivery means drawing air into the condenser section via the openings in the first and second sides of the bus, and discharging air from the condenser section via the opening in the back of the bus,
said first evaporator air delivery means drawing return air from the bus, at a level above the condenser section,
said first evaporator air delivery means discharging conditioned air into the upper air duct distribution system,
said second evaporator air delivery means receiving conditioned air from said evaporator section via said air duct,
said second evaporator air delivery means discharging conditioned air into the lower air duct distribution system.

4,888,960

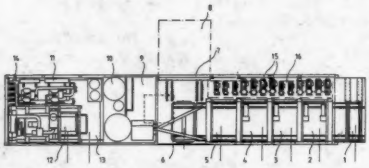
REFRIGERATION UNIT FOR PRODUCE AND, IN PARTICULAR, FOR FRESH VEGETABLES

Jean Lara, Jaunay-clan, France, assignor to Igenov, Fortenay au Roses, France

Filed Sep. 29, 1988, Ser. No. 251,105
Claims priority, application France, Sep. 30, 1987, 87 13512
Int. Cl.[4] F25D *19/00*
U.S. Cl. 62—298 **15 Claims**

1. Refrigeration unit for produce, in particular for fresh vegetables, comprising at least two boxes which receive the produce to be processed and are provided with means for conveying a flow medium, which for at least one of the boxes

is refrigerated, onto said produce, said boxes being positioned side by side in alignment with each other and being provided with opposing lateral openings provided with closure doors sliding in a plane of said openings to open and close said openings; and means for a horizontal displacement in a single direc-



tion of said produce for the introduction of the produce to be processed into a first box, its transfer from the first box towards a second box and the removal of the processed produce from the second box, said openings when open, permitting said introduction, said transfer and said removal of said produce being processed in the unit.

4,888,961

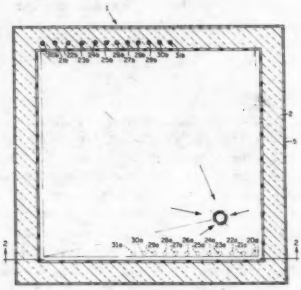
COLD PLATE APPARATUS

Dannie L. McMichael, San Antonio, Tex., assignor to Lancer Corporation, San Antonio, Tex.

Filed Jul. 11, 1988, Ser. No. 217,170

Int. Cl.[4] B67D *5/62*

U.S. Cl. 62—398 **4 Claims**



1. A cold plate for cooling liquids, comprising:

a block constructed of thermally conductive material such as aluminum and having a top surface upon which a quantity of ice can reside;

a plurality of beverage liquid coils formed of tubing, each coil having an inlet and an outlet, said plurality of coils coursing through the interior of said thermally conductive block in parallel fashion with the inlets and outlets of said plurality of coils located on opposite sides of said block for maximizing the thermal gradient existing between said coils and ice residing on the top surface of said block; and

a drain hole on the top surface of said block and located generally near the inlets of said plurality of coils for draining any accumulated water on the top surface.

4,888,962

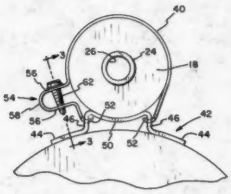
SUCTION ACCUMULATOR STRAP

Harold M. Harper, Brooklyn, and Mark C. Holtman, Ypsilanti, both of Mich., assignors to Tecumseh Products Company, Tecumseh, Mich.

Filed Jan. 6, 1989, Ser. No. 294,306

Int. Cl.[4] F25B *43/00*

U.S. Cl. 62—503 **19 Claims**



1. In combination, a hermetic compressor having a housing, said housing having retaining means disposed thereon;

an accumulator positioned adjacent the housing in closely spaced relationship therewith, said accumulator having an outer casing;

strap means disposed circumferentially around said accumulator casing and fastened to said retaining means, said strap means having an integral spring loop portion formed therein for establishing spring tension at the engagement of said strap means and said retaining means; and

means for compressing said loop portion for varying said spring tension whereby said accumulator is resiliently clamped to said housing.

4,888,963

CIRCULAR KNITTING MACHINE

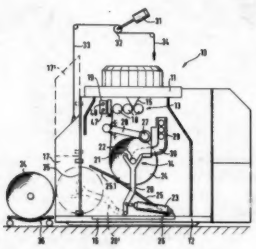
Werner Scherzinger, Bisingen, and Paul Neher, Messsteteen, both of Fed. Rep. of Germany, assignors to SIPRA Patententwicklungs, Albstadt and Beteiligungsgesellschaft mbH, Tailfingen, both of, Fed. Rep. of Germany

Filed May 27, 1988, Ser. No. 201,114

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1987, 3718659

Int. Cl.[4] D04B *15/88, 35/34*

U.S. Cl. 66—151 **19 Claims**



1. A circular knitting machine, comprising, a rotatable needle cylinder; a supporting plate rotating synchronously with said needle cylinder; and a product drawing off and winding device, said device including a roll bar arranged to support a product roll and provided with a bearing part which is displaceable for arranging a finished product roll, a roll bar magazine for supplying roll bars to said bearing part, a drawing off roller, cutting means movable substantially parallel to said drawing off roller, drive means for driving said roll bar and

including a drive shaft which abuts against a product roll and turns parallel thereto, said bearing part including a bearing support which is turnable for ejecting a product roll and has an open fork-shaped bearing trough for supporting ends of said roll bar, and a guiding element which is articulately connected with said supporting plate and extends inclinedly upwardly and outwardly relative to said roll bar outwardly, said guiding element extending over a whole width of a product roll and abutting with a pre-stress against the latter, said guiding element being freely turnable down to said supporting plate.

4,888,964

PLEATED KNIT FABRIC

Svein Klinge, 34 Whaleback Terrace, Ringwood, N.J. 07456

Filed Feb. 22, 1988, Ser. No. 158,611

Int. Cl.[4] D04B *23/08*

U.S. Cl. 66—193 **12 Claims**

1. A method for knitting a pleated fabric on a kitting machine having at least three guide bars, said method comprising the steps of: knitting two groups of stitches, group A and group B; forming stitch group A as two wales of spaced chain stitches; laying in a yarn joining said spaced wales; forming stitch group B as a series of adjacent wales of chain stitches from thread coming from a guide bar different from those employed in forming the group A stitches, one of said wales of group B joined to a wale of group A.

4,888,965

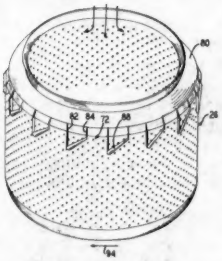
WATER DIVERTER FOR SPINNING BASKET OF AUTOMATIC WASHER

Richard L. Fanson, and Ralph E. Denny, both of St. Joseph Township Berrien County, Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Oct. 5, 1988, Ser. No. 254,308

Int. Cl.[4] D06F *17/06, 39/08*

U.S. Cl. 68—23.4 **14 Claims**



1. An automatic washer comprising:

a wash tub with an open top;

a wash basket rotatably carried within said wash tub for receiving a fabric load and a liquid to wet said fabric load; said wash basket having a perforated wall for providing liquid communication between said basket and tub, with a top row of perforations spaced below said top of said tub;

means for spinning said wash basket within said wash tub; and

liquid diverter means comprising vertical rib means carried on an exterior of said wash basket having a substantially vertical liquid intercept wall means and a liquid carrying channel formed at an acute angle from horizontal to divert at least some liquid passing through said perforations during said spinning of said wash basket so said liquid will impact against said wash tub above said top row of basket perforations.

4,888,966

THROUGHFEED SAMMYING PRESS

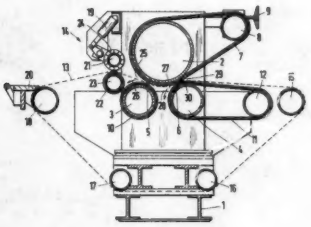
Horst Zäpfel, Karlsruhe, and Erich Cabelmann, Kronberg, both of Fed. Rep. of Germany, assignors to Maschinenfabrik Moenus-Turner gmbH, Oberursel, Fed. Rep. of Germany

Filed Aug. 9, 1988, Ser. No. 230,174

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1987, 3726757

Int. Cl.[4] C14B *1/32*

U.S. Cl. 69—41 **11 Claims**



1. A sammying- press comprising a frame; a first pressure applying unit including at least one first pressure roll mounted in said frame; a second pressure applying unit including at least one second pressure roll mounted in said frame and defining with said at least one first pressure roll a nip for the passage of objects to be sammied; a first liquid-absorbent band extending through said nip adjacent said at least one first pressure roll; a second liquid-absorbent band extending through said nip adjacent said at least one second pressure roll; and means for feeding objects in a direction into, through and beyond said nip, including a liquid-permeable endless belt conveyor having a reach extending between said first and second bands and through said nip, one of said first and second pressure rolls and the respective liquid-absorbent band being disposed within the confines of said conveyor.

4,888,967

BICYCLE LOCK

Li-Tsao Kuo, No. 16, Lane 459, Sec. 1, An Ho Rd., Tainan, Taiwan

Filed Dec. 22, 1988, Ser. No. 288,219

Int. Cl.[4] E05B *67/38*

U.S. Cl. 70—52 **2 Claims**

1. An improved bicycle lock, comprising:

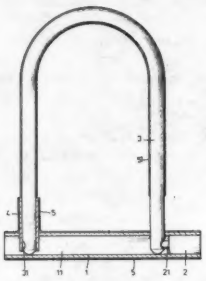
a lock body having a latitudinal hole through the body, two holes at one side and a scarf trough in one of said two holes, and a cover;

a lock core having an actuating member at one end, inside one end of the latitudinal hole of said lock body;

a U-shaped latch rod, having an outside groove at the end of each of two legs and a cover; and

a substantially cylindrical protecting barrel inserted into said

scarf trough of said lock body through said one of said side holes thereof and extending outwardly of said lock



body to receive one of said grooved ends of said latch rod to prevent deliberate breakage of said latch rod thereat.

4,888,968

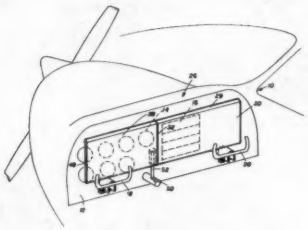
AIRCRAFT THEFT GUARD

Frank D. Azvedo, Elk Grove, Calif.

Filed Dec. 27, 1988, Ser. No. 290,297

Int. Cl.[4] B65D *55/14*

U.S. Cl. 70—163 **7 Claims**



1. An aircraft theft guard comprising:

a shield of rigid sheet metal adapted to substantially cover the instrument panel of an aircraft;

means for locking said shield to the control columns of said aircraft to prevent removal thereof from said instrument panel;

means on said shield to block axial movements of said control columns;

means on said shield to prevent rotary movements of said control columns; and

means on said shield to prevent control movements of the throttle control of said aircraft.

4,888,969

WHEEL LOCKING APPARATUS

Hyman Suroff, c/o Abe Wollner, 189 Midfield Rd., Colonia, N.J. 07067

Filed Aug. 12, 1988, Ser. No. 231,347

Int. Cl.[4] B60R *25/00*

U.S. Cl. 70—226 **9 Claims**

1. A wheel locking apparatus for hampering rotation of a wheel, which is mounted on a vehicle by a plurality of threaded studs and cooperating wheel nuts, said locking apparatus being mounted on a pair of said wheel studs, comprising:

(a) first and second elongated member means having,

(i) one end adapted to extend beyond the circumferential edge of said vehicle wheel, and

(ii) connecting means disposed along the length of said elongated member means;

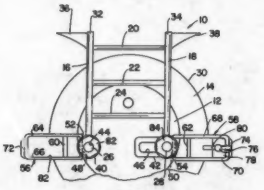
(b) hinge means, said hinge means being disposed upon the the other end of each of said first and second elongated member means, said hinge means having;

(i) a flat portion with a first through aperture disposed therein adapted to receive said wheel studs therethrough, and

(ii) a second through aperture disposed in a plane perpendicular to said first through aperture;

(c) first pivotable arm means, said first arm means including,

(i) a first hinge portion adapted to cooperate with said second through aperture of one of said hinge means,



(ii) first tamperproof bar means, said first tamperproof bar means covering one of said pair of threaded mounting wheel studs when pivoted to a closed position; and

(d) second pivotable arm means, said second pivotable arm means having,

(i) a second hinge portion adapted to cooperate with said second through aperture of the other of said hinge means,

(ii) locking means disposed proximate the distal edge remote from said second hinge portion of said second pivotable arm means, and

(iii) second tamperproof bar means, said second tamperproof bar means covering the other of said pair of mounting wheel studs.

4,888,970

APPARATUS HAVING A MECHANICAL KEY AND A TRANSMITTER FOR ACTUATION OF A LOCK SYSTEM

Hans Kinzler, and Aleksander Kotowicz, both of Regensburg, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 20, 1987, Ser. No. 110,450

Claims priority, application Fed. Rep. of Germany, Oct. 20, 1986, 3635609

Int. Cl.[4] E05B *19/00*

U.S. Cl. 70—456 R **9 Claims**

1. A lock unit, comprising:

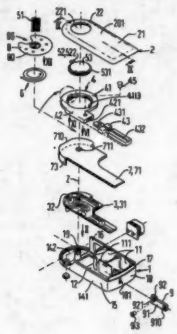
a mechanical key having a circular bearing portion and a blade extending eccentrically from said bearing portion, said circular bearing portion being coaxial with a central axis;

a transmitter for generating a modulated transmission signal for remotely controlling a lock system equipped with a receiver;

a common housing for said key and said transmitter, said housing formed of a lower part and a flat cover, said key being rotatably seated in said flat cover;

a circular bearing member in said housing on which said circular bearing portion of said key is rotatably seated about said central axis so that a blade of said key is pivotable between a working position extending from said housing and a fixed position in a key compartment of said housing;

a battery compartment provided in said lower part of said housing next to and parallel to said key compartment; and



means for pivoting said lower part relative to said cover about said central axis to provide access to at least said battery compartment in one position.

4,888,971

PIPE BENDING MACHINE

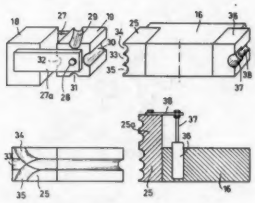
Rigobert Schwarze, Olpener Str. 460–474, 500 Köln 91, Fed. Rep. of Germany

Continuation of Ser. No. 47,988, May 7, 1988, abandoned. This application Sep. 19, 1988, Ser. No. 246,453

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1986, 3616302

Int. Cl.[4] B21D *7/04*

U.S. Cl. 72—157 **4 Claims**



1. A pipe bending machine having a movable support; a bending template mounted on said movable support; and means for clamping a pipe, said clamping means comprising clamping jaws spatially separate from one another and movable relative to one another to an operative position, one of said clamping jaws being mounted on said bending template while the other of said clamping jaws is mounted on said movable support, one of said clamping jaws having a plurality of superposed clamping surfaces, each of said clamping surfaces being provided with a different contour for various pipe shapes to be clamped while the other of said clamping jaws is provided with a plurality of separate clamping surfaces, each of said separate clamping surfaces having only one contour corresponding to one of said superposed clamping surfaces and to the portion of the pipe to be clamped, so that upon movement of said other clamping jaw, each of said plurality of clamping surfaces can be brought individually into a postion for cooperating with a selected one of said superposed clamping surfaces of said one of clamping jaw.

4,888,972

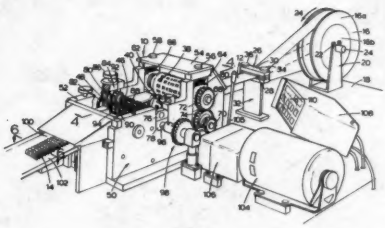
PROCESS AND APPARATUS FOR THE MANUFACTURE OF RADIATOR COOLING FINS

Jack Rouse, Pickering, Canada, assignor to Pronto Auto Repair Dealerships Inc., Pickering, Canada

Filed Jul. 1, 1988, Ser. No. 214,321

Int. Cl.[4] B21D *13/04*

U.S. Cl. 72—186 **6 Claims**



1. In an apparatus for corrugating a length of malleable metallic strip into a corrugated strip of a series of zig-zag folds, said apparatus including opposing counter-rotating forming dies for forming a series of equally spaced-apart impressions in such strip, means for corrugating such strip with the impressions formed therein by folding such strip intermediate adjacent impressions in alternating opposing folds to form a series of zig-zag folds, said corrugating means comprising opposing counter rotating corrugating dies having opposing radially extending teeth, means for driving said counter-rotating forming dies in synchronism with each other and means for driving said counter-rotating corrugating dies in synchronism with each other, means for rotating said forming die drive means and means for transmitting rotary motion from said forming die drive means to said corrugating drive means, said transmission means having an effective gear ratio to synchronize rotation of said corrugating dies in phase with said forming dies to induce zig-zag folding in such strip of metal between the formed adjacent impressions, said transmission means including means for adjusting phase relationship of the rotation of said corrugating dies with rotation of said forming dies, the improvement wherein said means for adjusting phase relationship comprises:

a slip clutch for selectively disengaging said transmission means while said rotating means continues to rotate said forming die drive means to adjust the phase relationship of said counter-rotating corrugating dies relative to said counter-rotating forming dies, said slip clutch being continuously engaged with sufficient drive force to drive said counter-rotating corrugating dies in a metal strip feed direction, manually operable means for overcoming the drive force to advance rotation of said corrugating die drive means in the feed direction, as the clutch slips by engaging the manually operable means, the phase relationship of the rotation of said counter-rotating corrugating dies relative to the rotation of said counter-rotating forming dies is adjusted thereby on an infinite basis.

4,888,973

HEATER FOR SUPERPLASTIC FORMING OF METALS

Peter N. Comley, Cerritos, Calif., assignor to Murdock, Inc., Compton, Calif.

Filed Sep. 6, 1988, Ser. No. 240,595

Int. Cl.[4] B21D *37/16;* **B30B** *15/34;* **B29J** *5/08*

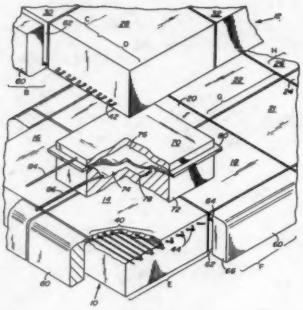
U.S. Cl. 72—342 **17 Claims**

1. A superplastic forming machine comprising a press with platens in the press in overlying relationship and a mold for superplastic forming therein wherein the platens comprise:

a first platen made of ceramic material having a first plurality of heater wires passing through said ceramic material

connected to a source of electrical energy for heating said wires wherein said wires pass predominantly in number in a given direction through the first platen; and,

a second platen formed of ceramic material having a second plurality of heater wires passing therethrough which are connected to a source of electrical energy for heating said



second platen wherein said second plurality of wires in said second platen are at a substantially right angle relationship to the wires of said first platen so as to heat areas at two opposite edge regions of each platen with wires extending along the side portions thereby heating the opposed side portions in a variable manner with respect to each platen.

4,888,974

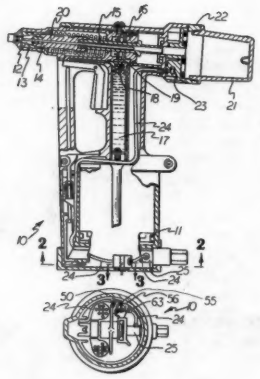
CONTROL VALVE FOR A MANDREL COLLECTION SYSTEM

Russell F. Mandell, Prospect, Conn., assignor to Emhart Industries, Inc., Farmington, Conn.

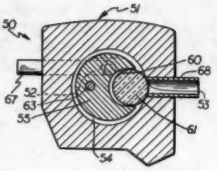
Filed Feb. 2, 1989, Ser. No. 306,003

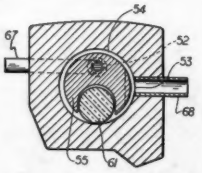
Int. Cl.[4] B21J *15/06*

U.S. Cl. 72—391 **1 Claim**



1. In a power operated blind rivet tool adapted to pull the mandrel of a blind rivet to upset the rivet body and thereby set the rivet, which tool includes a mandrel collection system for



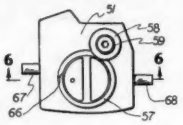


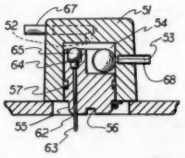
retrieving pulled mandrels, said collection system having an air line and a control valve associated therewith for controlling air supplied to the mandrel collection system, the improvement which comprises:

a control valve comprising a housing having an air inlet port and an air outlet port communicating with central cylindrical aperture having an open and a closed end;

a spindle fittingly engaged within said central aperture and having sealing means associated therewith located near the open end of said aperture;

said spindle having an outlet aperture positioned and adapted to accommodate a ball in sealing relation with said outlet port;





said spindle having an inlet aperture communicating with a passageway, said inlet aperture position and adapted to accommodate a ball in sealing relation with said inlet port and said passageway extending through said spindle and adapted to accommodate an actuator stem;

an outlet ball located in said outlet aperture;

an inlet ball located in said inlet aperture;

an actuating stem located in said passageway and communicating with said inlet ball whereby said inlet is sealed when the tool is placed on a support surface.

4,888,975

RESILIENT WEDGE FOR CORE EXPANDER TOOL

Milton W. Soward, and F. Pat Bailey, both of P.O. Box 609, Hawkins, Tex. 75765

Filed Apr. 18, 1988, Ser. No. 182,935

Int. Cl.[4] B21D *3/14, 41/02;* **F16C** *29/02, 33/20*

U.S. Cl. 72—392 **14 Claims**

1. A device for straightening a deformed core of a roll of sheet material, including:

a hollow collar;

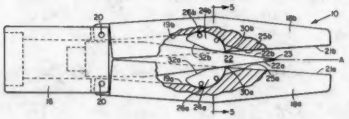
at least a pair of jaws comprised of a first and a second jaw,

the pair pivoted to the collar, the jaws having external and internal surfaces; the collar and the jaws being sized for receipt by the core;

a tongue with at least two faces tapered to an edge and mounted for longitudinal movement within the jaws and the collar;

means secured to the collar for selectively driving the tongue between the jaws to actuate the jaws outward;

a pair of wedges, said pair comprising a first wedge with a first face thereon and a second wedge with a second face thereon, the first wedge being mounted to the internal surface of the first jaw and the second wedge being mounted to the internal surface of the second jaw, said



pair of wedges thereby being in an opposing relationship on the internal surfaces of the jaws for engaging at an acute angle the faces of the tongue during the driving of the tongue between the jaws, wherein such engaging prevents contact between the jaws and the tongue, said pair of wedges having a surface with a low coefficient of friction which does not bind to the surface of the tongue at pressures of 10 tons or more and is angled to engage the tongue and communicate 10 tons or more of pressure from the tongue to the jaws and is comprised of a material resilient enough and hard enough to withstand multiple engagement and disengagement of at least 10 tons of pressure without cracking, disintegration, or substantial permanent deformation.

4,888,976

DEVICE FOR MEASURING THE EFFECTIVE VISCOSITY OF A LUBRICANT

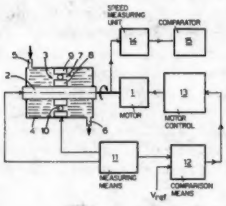
Karel N. Vermeiren, Woerden, Netherlands, assignor to SKF Industrial Trading and Development Co. B.V., Nieuwegein, Netherlands

Filed Oct. 21, 1986, Ser. No. 921,624

Claims priority, application Netherlands, Oct. 22, 1985, 8502876

Int. Cl.[4] G01N *19/00, 33/30*

U.S. Cl. 73—10 **4 Claims**



1. In a device for measuring the effective viscosity of a lubricant, comprising a motor, a sensor capable of beinbg driven by the motor, the sensor comprising means for supplying lubricant to be measured thereto, and a first measuring means for measuring a motor parameter that has a value corresponding to the viscosity of the lubricant, the improvement wherein the sensor is comprised of a bearing having two parts movable relative to one another, one of said parts being arranged to be driven by the motor, and further comprising regulating means for regulating the speed of said motor to maintain a condition in the bearing of no substantial roughness contacts between the parts of the bearing and wherein the regulating means comprises a second measuring means for measuring the percentage of contact time of the parts of the bearing with one another, a comparison means for comparing the percentage contact time with a predetermined reference value and for producing an output responsive thereto, and a motor control means for regulating the motor speed as a function of the output signal of the comparison means to maintain the percentage contact time equal to the predetermined reference value and wherein said first measuring means determines the motor speed and said first measuring means include means for indicating the viscosity as a function of said motor speed.

4,888,977

METHOD OF ASCERTAINING THE RATE OF FLUID FLOW THROUGH THE VENTILATION ZONES OF ROD-SHAPED ARTICLES OF THE TOBACCO PROCESSING INDUSTRY

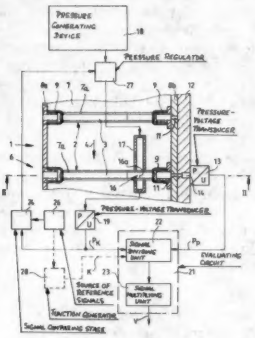
Firdausia Chehab, Hamburg, and Franz P. Koch, Schwarzenbek, both of Fed. Rep. of Germany, assignors to Körber AG, Hamburg, Fed. Rep. of Germany

Filed Jan. 24, 1989, Ser. No. 301,537

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1988, 3802453

Int. Cl.[4] G01N *15/08*

U.S. Cl. 73—38 **8 Claims**



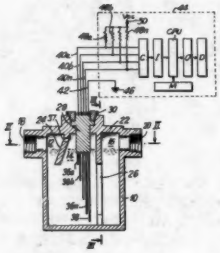
1. A method of ascertaining the rate of fluid flow through the wrappers of a series of rod-shaped articles of the tobacco processing industry, particularly filter cigarettes, wherein the wrappers have ventilation zones and the ventilation zones exhibit a predetermined permeability to fluids, comprising the steps of transporting the articles seriatim in a predetermined direction along a predetermined path; sealing the ventilation zones of successive articles from the surrounding atmosphere not later than in a predetermined portion of said path; applying to the sealed ventilation zones an external pressure which differs from atmospheric pressure; monitoring the pressure at one end of each of said series of articles in said portion of said path; generating first signals denoting the monitored pressure, said first signals being indicative of the rate of fluid flow through the respective ventilation zones; monitoring said external pressure; generating second signals denoting the monitored external pressure; and converting said second signals and the respective first signals into third signals denoting the rate of fluid flow through the ventilation zones.

4,888,978

INSTRUMENT TO MEASURE LEAKAGE OF STEAM FROM A STEAM TRAP

Hideaki Yumoto; Masao Yonemura, and Yoshito Yamada, all of Hyogo, Japan, assignors to TLV Co., Ltd., Hyogo, Japan

Continuation-in-part of Ser. No. 84,481, Aug. 11, 1987, abandoned. This application Nov. 21, 1988, Ser. No. 274,668
Claims priority, application Japan, Aug. 11, 1986, 61-188847
Int. Cl.[4] G01M *3/26*
U.S. Cl. 73—40 **6 Claims**



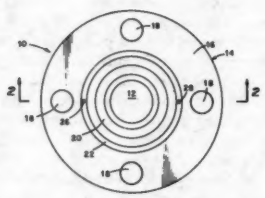
1. An instrument for measuring leakage of steam in a steam trap comprising:
- means forming a liquid retaining chamber;
- means defining a fluid inlet port and a fluid outlet port to and from said retaining chamber;
- bulkhead means in said liquid retaining chamber separating said chamber into an inlet chamber in flow communication with said inlet port and an outlet chamber in flow communication with said outlet port;
- means defining openings connecting said inlet chamber and said outlet chamber at a part lower than said inlet and outlet ports;
- partition means in said inlet chamber extending to a location lower than said inlet port separating said inlet chamber into an inlet space and a measuring chamber;
- means for measuring water level in said measuring chamber;
- means for calculating steam leakage quantity based upon an interrelationship between water level as measured by said measuring means and gas volume passing through an opening formed in said bulkhead means; and
- means for indicating the steam leakage quantity calculated by said calculating means.

4,888,979

LEAK DETECTION AID

Timothy J. Steeper, Graniteville, S.C., assignor to The United States Department of Energy, Washington, D.C.

Filed Feb. 15, 1989, Ser. No. 310,556
Int. Cl.[4] G01M *3/22*
U.S. Cl. 73—40.7 **2 Claims**



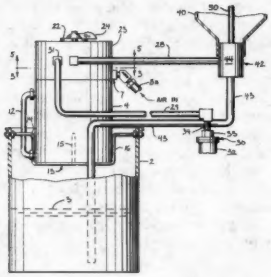
2. A method for detecting leaks across an O-ring sealing an end surface of a flange at the end of a pipe, container, and the like, against a mating surface, said method comprising the steps of
- cutting a channel in said flange radially outward of said O-ring, said channel having an entrance to and an exit from said flange exterior to said pipe;
- injecting a leak detection fluid in said entrance while withdrawing said leak detection fluid from said exit so that said leak detection fluid, carried by and generally confined to said channel, flows past said O-ring;
- measuring for the presence of said leak detection fluid at a point radially inward of said O-ring.

4,888,980

APPARATUS AND METHOD FOR TESTING, FILLING AND PURGING CLOSED FLUID SYSTEMS

Raymond D. DeRome, 10401 - 336th Ave., Twin Lakes, Wis. 53181

Filed Apr. 21, 1989, Ser. No. 341,738
Int. Cl.[4] G01M *3/26*
U.S. Cl. 73—49.2 **6 Claims**



1. An evacuation unit for testing the fluid tightness of a closed fluid system having an access port and for filling the system with fluid through said access port, comprising:
- a first reservoir containing a first fluid;
- a second reservoir containing a second fluid;
- sequence valve means disposed between and communicating with said first and second reservoirs for selective positioning between a first position communicating said first reservoir with an outlet and a second position communicating said second reservoir with said outlet;
- vacuum pump means for producing a vacuum of a predetermined pressure less than atmospheric pressure, said vacuum pump means includes a source of air under pressure, a venturi, and conduit means interconnecting said pressurized air source and said venturi;
- connection means for releasable and sealable connection to an access port of a closed fluid system, said connection means includes a flexible hose having opposite ends, a filler head on one end of said hose for attachment to said access port, and coupling means on the other end of said hose;
- control valve means disposed between said coupling means and said vacuum pump means for selective positioning between a first position communicating said vacuum pump means with said connection means to produce a vacuum in the system, a second position isolating said connection means and system to test for fluid tightness, and a third position communicating said outlet of said sequence valve means with said connection means for filling the system with said first and second fluids; and
- a separation tank disposed between said vacuum pump means and said valve means so that fluid drawn therein separates into a liquid phase and a gas phase to remove

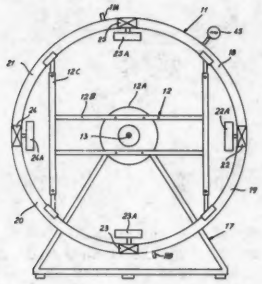
entrained gas from said fluid when said valve means is in said first position.

4,888,981

APPARATUS FOR TESTING OF FLUIDS

Edgar Johansen, Hjalmar Haalkesv. 4, N-7000 Trondheim, Norway, and Hans K. Johnsen, Dybdahlsv. 9a, N-7000 Trondheim, Norway

Filed Dec. 11, 1985, Ser. No. 807,902
Claims priority, application Norway, Dec. 12, 1984, 844970
Int. Cl.[4] G01N *37/00*
U.S. Cl. 73—60.1 **4 Claims**



1. An apparatus for testing fluids, especially for testing physical characteristics or susceptibility to process fluids, comprising:

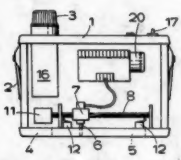
a rotor-driven organ with at least one pipe segment that is arched concentrically to the rotational axis, and that can transport the fluid that will be tested and retrieve it during rotation, wherein the rotor-driven organ comprises two or more arched pipe segments and a similar number of valves, each valve being connected between two adjacent arched pipe segments.

4,888,982

METHOD AND APPARATUS FOR EVALUATING THE HARDENING OF CHEMICALLY BONDED FOUNDRY SAND MOLDS AND CORES

David C. Chilton, and Richard E. Simmons, both of Worcester, Great Britain, assignors to BCIRA, Birmingham, England

Filed Sep. 8, 1988, Ser. No. 241,619
Claims priority, application United Kingdom, Sep. 8, 1987, 8721043
Int. Cl.[4] G01N *3/48*
U.S. Cl. 73—81 **9 Claims**



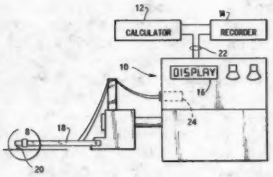
1. A portable apparatus for evaluating the hardening of chemically bonded foundry sand molds and cores comprising a housing designed to be placed in engagement with and to cover a surface of a foundry mold of core, said housing having a flat base plate protecting said covered surface from the atmosphere, said base plate including opening means therein, a probe including a solenoid mounted in said housing, energization of said solenoid applying a predetermined impulse to said probe to cause said probe to protect from said housing through said opening means in said base plate and penetrate the mold or core, means for subsequently withdrawing said probe and displacing said probe laterally in relation to said surface and said housing, said housing remaining in a fixed position relative to said mold or core, means for repeating the application of said impulse, subsequent withdrawal, and lateral displacement of said probe, and means for monitoring the stroke of said probe following each said impulse and giving a signal when the stroke is less than a predetermined value.

4,888,983

PROFILOMETRY

Lawrence G. Dunfield, Bright's Grove, and Kar P. Lok, Sarnia, both of Canada, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 20, 1988, Ser. No. 183,933
Int. Cl.[4] G01N *33/34*
U.S. Cl. 73—104 **7 Claims**



1. A rapid method to determine surface properties of coated paper, and one or more surface characterizations of the unprinted coated paper selected from the group consisting of specular gloss, reflectance and air resistance, and predict the printed properties of coated paper which comprises taking one or more measurements across the surface of an unprinted coated paper using a portable profilometer comprising a stylus, a traverse unit, a pick up, and one or more members selected from the group consisting of a recorder, a calculator, a display unit, and a computer interface means, wherein measurements are taken at cut offs of from 0.25 to 25 mm and the traverse has a stroke of from 1.5 to up to 25 mm to measure one or more parameters selected from the group consisting of mean surface contour, the average peak to valley height, the mean peak height, and the peak count per cm., in a direction perpendicular to the plane of the paper within the range +100 micrometers from the means surface of the paper, and relating the measured values to a calibration system selected from the group consisting of biaxial plots of the surface print properties of a representative sample of the papers against the measured values for the representative sample of at least nine papers; and surface properties and print properties of paper using a function generated by subjecting the surface properties, print properties and measured values of a representative sample of at least nine papers to a statistical regression to generate one or more functions of the formula:

(i) print or surface property of a paper=A (contour measurement)+B; and

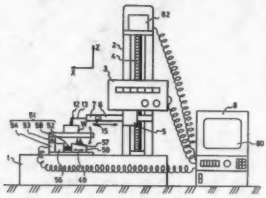
(ii) print or surface property of the paper=C (contour measurement)+D (measurement of a property of the unprinted paper selected from the group consisting of specular gloss, reflectance, and air resistance)+E;

wherein A, B, C, D, and E are values generated by the statistical regression of the data.

4,888,984
LEVELLING DEVICE OF ROUGHNESS MEASURING MACHINE

Chihiro Marumo; Yoichi Toida; Masatsugu Nemoto; Junichi Iida, and Kenji Sakuma, all of Kawasaki, Japan, assignors to Mitutoyo Corporation, Tokyo, Japan

Filed Apr. 5, 1988, Ser. No. 178,050
Claims priority, application Japan, Apr. 6, 1987, 62-52472[U]
Int. Cl.[4] G01B *5/28*
U.S. Cl. 73—105 **5 Claims**



1. A levelling device of a roughness measuring machine, comprising:

tilt angle calculating means for searching the center locus of a measured value in response to a displacement signal from a displacement detecting means of said roughness measuring machine and for searching a tilt angle of the center locus to the base line;

a tolerable tilt angle setter for setting a tolerable tilt angle of the center locus of the measured value to the base line;

a comparator for comparing an output signal from said tilt angle calculating means with an output signal from said tolerable tilt angle setter to determine whether the tilt angle of the center locus of the measured value is larger than the tolerable tilt angle or not; and

position change means for receiving an output from said comparator as an output to change the position of an object to be measured or said displacement detecting means such that a tilt angle of the measured value in the succeeding measuring becomes smaller than said tolerable angle, said position change means including a mounting means having the object rested thereon and a tilting means for tilting said mounting means;

whereby automatic levelling work can be performed such that that measured value does not scale out of the upper and lower limit values.

4,888,985
METHOD AND APPARATUS FOR TESTING TAPE BOND STRENGTH

Dennis K. Siemer, 217 Viking Dr., Mankato, Minn. 56001

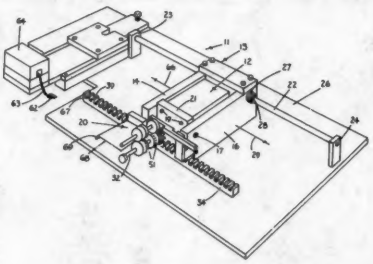
Filed Apr. 3, 1989, Ser. No. 332,599
Int. Cl.[4] G01N *19/04*
U.S. Cl. 73—150 A **23 Claims**

1. A device for testing the bond strength between first and second bonded layers of a laminated material which comprise a motor means, chassis means, a guide means mounted on said chassis means, track means mounted on said chassis, drive means powered by said motor means and engaging said track means, said motor means being mounted on said guide means, gauge means for restraining said first bonded layer and for measuring the force applied to said first layer, engaging means mounted on said motor means and driven by said motor means for engaging said second bonded layer, energizing means for selectively applying power to said motor means to activate said drive means to move said drive means and motor means along said track means and said guide means to apply force to said second bonded layer, said engaging means moving laterally away from said gauge means to apply force to the bond between the first and second bonded layers, said gauge means detecting the force applied to said layer and recording means responsive to said gauge means for recording the magnitude of the force measured by said gauge means.

19. A method of measuring the force necessary to separate first and second bonded layers of a laminated material which comprises the steps of

a. immobilizing said first bonded layer,

b. connecting said second layer to a stepper motor, said stepper motor being movable along a track means



c. energizing said motor with an electrical signal of predetermined frequency for a predetermined period of time to apply sufficient force to said second layer to separate said second layer from said first layer,

d. measuring the force necessary to separate said second layer from said first layer,

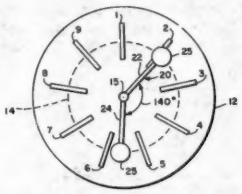
e. generating a signal indicative of the magnitude of the force measured when said second layer is separated from said first layer, and then

f. recording the magnitude of said signal.

4,888,986
ROTATIONAL POSITION INDICATOR

John S. Baer, Bar Harbor, and Michael A. Vietti, Swans Island, both of Me., assignors to RainWise, Inc., Bar Harbor, Me.

Filed Mar. 13, 1989, Ser. No. 322,620
Int. Cl.[4] G01P *13/02*; H03M *1/00*
U.S. Cl. 73—188 **20 Claims**



1. A rotational position indicator comprising:

a stator having nine position sensors substantially equally spaced around the circumference of circle;

an armature mounted for rotation on an axis located at the center of the circle, said armature being formed with two position sensor actuating means mounted at approximately 140° relative to each other, each said position sensor actuating means being mounted at a radial position for selectively actuating the position sensors upon rotation of the armature; and

electrical circuit means coupled to each position sensor for indicating actuation or not of the respective position sensor thereby providing unique position codes for successive

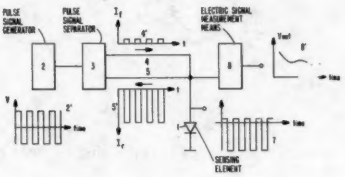
intervals of angular positioning of the armature relative to the stator.

4,888,987

HIGH SENSITIVITY MEASUREMENT DEVICE FOR MEASURING VARIOUS PARAMETERS OF NON-ELECTRIC QUANTITY

Kaixun Zhang, No. 1, Jiao Chang Kou, De Wai, Beijing, China

Filed Nov. 6, 1987, Ser. No. 118,220
Claims priority, application China, Nov. 18, 1986, 86107738
Int. Cl.[4] G01F 1/68
U.S. Cl. 73—204.14 **12 Claims**



1. A measurement device for measuring various parameters of non-electric quantity such as flow speed, flow rate, heat conductivity, composition, and change in vacuum of a tested medium, comprising:

a sensing element constituted by a single p-n junction or a plurality of p-n junctions connected in series in the same direction, alternatively operating in forward condition and reverse breakdown states, and directly contacting said tested medium for carrying out heat exchange;

a pulse signal generator having its output voltage polarity changed alternatively;

a pulse signal separator constituted by a circuit which has different impedances for forward and backward currents and connected between said sensing element and said pulse signal generator for alternatively providing said sensing element with different magnitude backward and forward currents in accordance with the output voltage of said pulse signal generator, said circuit limiting the forward current pulse magnitude of the p-n junction to a very small value and making the reverse breakdown current pulse magnitude of the p-n junction keep a sufficient large value; and

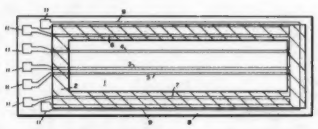
an electric signal measurement means for measuring electric signals related to said sensing element and corresponding to said parameters of said tested medium.

4,888,988

SILICON BASED MASS AIRFLOW SENSOR AND ITS FABRICATION METHOD

Ki W. Lee, Williamsburg, and Il-Hyun Choi, Newport News, both of Va., assignors to Siemens-Bendix Automotive Electronics L.P., Troy, Mich.

Filed Dec. 23, 1987, Ser. No. 137,299
Int. Cl.[4] G01F 1/68
U.S. Cl. 73—204.26 **43 Claims**



1. A mass airflow sensor having a longitudinal axis comprising:

a dielectric diaphragm;

a thin-film heating element disposed on said diaphragm;

a thermally conductive semiconductor rim comprising a heavily doped etch stopped region encompassing at least a major portion of said dielectric diaphragm; and

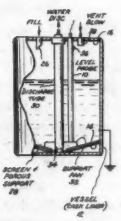
at least one thin-film sensing element disposed on said diaphragm, said at least one sensing element being disposed at least in part over said semiconductor rim, whereby the temperature gradient between the heating element and said at least one sensing element may be monitored to determine the airflow rate, said heating element being centrally disposed substantially along the longitudinal axis of the sensor and a plurality of sensing elements disposed on both sides of said heating element.

4,888,989

LEVEL SENSOR SYSTEM

John C. Homer, Chardon, Ohio, assignor to General Signal Corporation, Stamford, Conn.

Filed Feb. 26, 1986, Ser. No. 833,942
Int. Cl.[4] G01F 23/00, 23/26
U.S. Cl. 73—304 C **20 Claims**



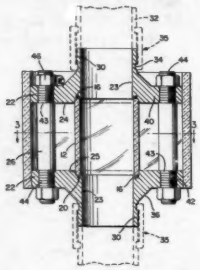
1. Apparatus for sensing the level of flowable material in a vessel which comprises first and second members to sense two fluidic levels, said first member having a top and a bottom and extending longitudinally therebetween, said member extending longitudinally in said vessel, said member having a conductive surface which extends longitudinally along said member, an insulating layer having an interior surface and an exterior surface, said interior surface being disposed on said member encompassing said conductive surface, said insulating layer insulating said conductive surface from the material in said vessel, said conductive surface and said insulating layer defining a first capacitor, the capacitance of which depends upon the level of material in said vessel, the second member having a top and a bottom and extending longitudinally therebetween, said second member also extending longitudinally into said vessel, said second member having longitudinally extending surfaces on opposite sides, said first and second members defining a longitudinally extending space between one of said surfaces of said second member and said exterior surface of said insulating layer on said first member, means for controlling the flow into said space from said vessel, a conductive element disposed in insulated relationship on said second member and extending longitudinally, another insulating layer disposed on said second member and encompassing said conductive element, said conductive element and said insulating layer defining a second capacitor, the capacitance of which depends upon the level of material in said vessel along the surface of said second member opposite to said one of said surfaces thereof.

4,888,990

SIGHT GLASS APPARATUS

David E. Bryan, Buchanan; Carl M. Dudding, Eagle Rock, and John W. Martin, Buchanan, all of Va., assignors to Gals Industries, Inc., Eagle Rock, Va.

Filed May 2, 1988, Ser. No. 189,348
Int. Cl.[4] G01F 23/02
U.S. Cl. 73—326 1 Claim



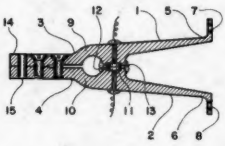
1. A sight glass apparatus comprising a pair of spaced parallel annular flanges, each of said flanges including a passageway therethrough with the passageways being aligned, a transparent tubular member extending between said flanges with the ends of the tubular member being sealingly engaged with the flanges around the periphery of said passageways, means connecting the flanges to pipes to form a flow path through the tubular member to enable observation of the flow conditions, and a plurality of circumferentially spaced studs interconnecting the flanges outwardly of the tubular member, each of said studs including a shoulder adjacent each end thereof, said shoulders being in abutting engagement with the facing surfaces of the flanges to maintain the flanges in predetermined spaced relation, an annular resilient seal between each end of the tubular member and adjacent flange to exert resilient compression forces to the tubular member when the flanges are clamped against the shoulders to isolate the tubular member from forces exerted on the flanges by the pipes and flow path conditions, the internal periphery of the tubular member and passageways being substantially equal to reduce restriction and turbulence in the flow path, each flange including a recess at the juncture between the inner surface of the flange and the passageway and a groove in the axial inner surface of the recess, the ends of the tubular member being telescoped into the recesses to maintain alignment of the tubular member with the flow path, said seal being an O-ring seal positioned between the axial inner surface of the groove and the end of the tubular member, each stud including a reduced threaded and extending axially from each shoulder, each flange including a plurality of apertures receiving the threaded ends of the studs, a retaining nut threaded on each end of each stud to rigidly secure the flanges in accurately spaced relation by clamping the flanges against the shoulders on the studs, a portion of the peripheral surface of the O-ring seal projecting from the groove and in contacting engagement with the end of the tubular member when uncompressed with assembly of the flanges, tubular member and studs transmitting compressive forces through the O-ring seal thereby limiting and controlling the forces exerted on the tubular member and isolating the tubular member from forces exerted on the flanges by the pipes and flow conditions, said tubular member being constructed of borosilicate glass, said means connecting the flanges to pipes including a tubular rim on the outer surface of each flange having an inner periphery substantially equal to the inner periphery of the passageways and the inner periphery of the tubular member, a transparent acrylic shield encircling the flanges and tubular member and means extending through the shield and resting against one of the flanges to support the shield.

4,888,991

RELATIVE MOTION SENSOR

Hyok S. Lew, 7890 Oak St., Arvada, Colo. 80005

Filed Nov. 21, 1988, Ser. No. 273,462
Int. Cl.[4] G01R 27/26
U.S. Cl. 73—658 10 Claims



1. A device for detecting relative motion between two objects comprising in combination:

(a) a first and second elongated members disposed in a side by side arrangement with a space therebetween and connected to one another at first extremities thereof, wherein second extremities of the first and second elongated members opposite to said first extremities include securing means; and

(b) at least one Piezo electric element of the disc shape disposed intermediate said first and second extremities of the first and second elongated members and between the first and second elongated members in a squeezed arrangement therebetween;

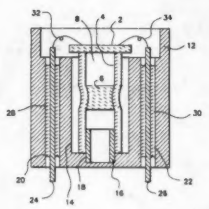
whereby the first and second elongated members respectively connected to two objects under relative motion experience relative pivoting movement about a pivot axis located at said first extremities of the first and second elongated members and the Piezo electric element generates elctrical signal representing the relative motion between the two objects.

4,888,992

ABSOLUTE PRESSURE TRANSDUCER AND METHOD FOR MAKING SAME

Milton W. Mathias, Colorado Springs, Colo., and Douglas W. Wilda, Ambler, Pa., assignors to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 181,769, Apr. 15, 1988, abandoned.
This application Jul. 12, 1989, Ser. No. 378,468
Int. Cl.[4] G01L 9/04
U.S. Cl. 73—727 15 Claims



1. A method for making an absolute pressure transducer including the steps of mounting a strain-sensitive plate on one end of a hollow tube to form a fluid-tight seal therewith, inserting a loose plug within the bore of the tube to define a chamber exposed to the plate, exposing the interior of the tube to a vacuum, concurrently heating the plug and the tube in the vicinity of the plug to allow the heated tube section to fuse

with the plug to form a fluid-tight seal to trap the vacuum in the chamber.

4,888,993

APPARATUS FOR MEASURING REDUCTION RATIO OF ROLLED MATERIAL

Masayoshi Yamaoka; Kiyomi Tsutsui, both of Kitakyushu; Tadashi Inoue, Noogata, and Toyoki Takahashi, Kitakyushu, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

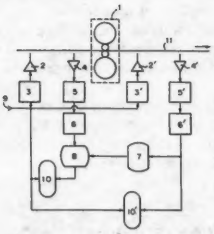
PCT No. PCT/JP87/00794, § 371 Date Jun. 10, 1988, § 102(e) Date Jun. 10, 1988, PCT Pub. No. WO88/02669, PCT Pub. Date Apr. 21, 1988

PCT Filed Oct. 16, 1987, Ser. No. 251,227

Claims priority, application Japan, Oct. 17, 1986, 61-248216

Int. Cl.[4] G01N *3/00*

U.S. Cl. 73—760 7 Claims



1. An apparatus for measuring a reduction ratio of a rolled material from moving speeds of the material at inlet and outlet sides of a rolling mill, comprising:

an inlet magnetizing means and an output magnetizing means;

instructing means for providing magnetizing instructions, said inlet magnetizing means being disposed at the inlet and responsive to magnetizing instructions for forming a first magnetic mark on the material before being rolled in the rolling mill, said outlet magnetizing means being disposed at the outlet and responsive to the magnetizing instructions for forming a second magnetic mark on the material after being rolled in the rolling mill;

an inlet detecting means, coupled with said inlet magnetizing means, for detecting the first magnetic mark at a location which is a first predetermined distance from said inlet magnetizing means in a direction of movement of the material;

an outlet detecting means, coupled with said outlet magnetizing means, for detecting the second magnetic mark at a location which is a second predetermined distance from said outlet magnetizing means in the direction of movement of the material;

an inlet comparator means for comparing an output signal of said inlet detecting means to a first threshold;

an outlet comparator means for comparing an output signal of said outlet detecting means to a second threshold;

gate signal generating means, responsive to a detection signal from said outlet comparator means, for generating a gate signal when the output signal of said outlet detecting means exceeds the second threshold;

gate means, responsive to the gate signal and a detection signal from said inlet comparator means, for generating a stop signal indicative of a logical product value of the gate signal and the detection signal from said outlet comparator means;

first counter means, responsive to a first start signal of the magnetizing instructions for starting counting, and responsive to the stop signal for stopping counting, to obtain a first elapsed time; and

second counter means, responsive to a second start signal of the magnetizing instructions for starting counting, and responsive to the detection signal from said outlet comparator means for stopping counting, to obtain a second elapsed time, whereby the speeds of movement of the magnetic marks at the inlet and outlet sides may be determined from the first and second elapsed times and the reduction ratio of the material may be computed from the speeds of movement.

4,888,994

METHOD OF CARRYING OBJECTS INTO AND FROM A FURNACE, AND APPARATUS FOR CARRYING OBJECTS INTO AND FROM A FURNACE

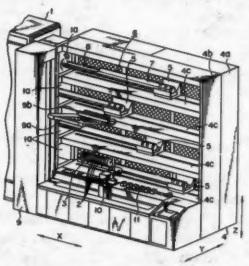
Shin Nakamaki, Machida, and Yuzuru Sasahara, Hachioji, both of Japan, assignors to Tel Sagami Limited, Kanagawa, Japan

Filed Nov. 18, 1988, Ser. No. 273,063

Claims priority, application Japan, Nov. 18, 1987, 62-289408

Int. Cl.[4] G01B *5/30*

U.S. Cl. 73—760 16 Claims



1. A method of carrying an object into and from a thermal treatment furnace, said method comprising the steps of:

measuring a first physical transformation amount applied on a loading/unloading means supporting the object before the object is loaded into the thermal treatment furnace:

measuring a second physical transformation amount being applied on the loading/unloading means after wafers mounted on the object have been thermally treated in the furnace;

comparing the second physical transformation amount with the first physical transformation amount;

changing the position at which the object is mounted on the loading/unloading means, until the second physical transformation amount becomes equal to the first physical transformation amount; and

unloading the object from the thermal treatment furnace after the second physical transformation amount has become equal to the first physical transformation amount.

4,888,995

TEST SPECIMEN GRIP APPARATUS

John M. Curtis, 1500 Glenmar St., Natrona Heights, Pa. 15065

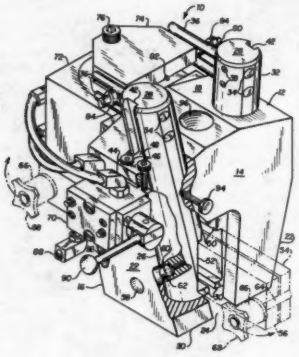
Filed Nov. 10, 1988, Ser. No. 269,357

Int. Cl.[4] G01N *3/02*

U.S. Cl. 73—859 23 Claims

1. In test specimen grip apparatus for use with tensile stress testing apparatus wherein said grip apparatus includes a housing having a connecting end adapted for securing said housing to said tensile stress testing apparatus, a test specimen receiving end opposite said connecting end of said housing, a pair of passages extending through said connecting end of said housing and converging toward said receiving end of said housing, a cavity adapted for receiving one end of a test specimen within said housing, said cavity being in operative communication with said pair of passages, and a pair of grip bars, one of

said grip bars being slidably mounted in one of said passages and the other of said grip bars being slidably mounted in the other of said passages, each of said grip bars extending above said connecting end of said housing and each of said grip bars having grip means carried on its lower end, said grip means being opposed and being adapted to compressively engage



opposed surface of a test specimen, whereby application of tensile stress to said test specimen increases the compressive engagement of said grip means with said test specimen,

the improvement comprising,

each of said opposed grip means being constructed and arranged to extend transversely of said grip bars a distance greater than the width of said grip bars.

4,888,996

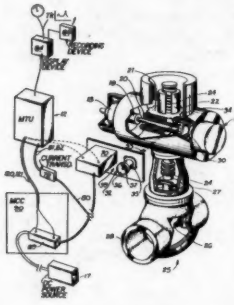
DC MOTOR OPERATED VALVE REMOTE MONITORING SYSTEM

Thomas A. Rak, Marietta, and T. Mark Whitaker, Hiram, both of Ga., assignors to Movats Incorporated, Kennesaw, Ga.

Filed Dec. 22, 1987, Ser. No. 136,911

Int. Cl.[4] G01M *19/00*

U.S. Cl. 73—862.19 **33 Claims**



1. Apparatus for monitoring the torque delivered by a DC electric motor which motor includes at least an armature shaft, and an armature within an armature circuit, said apparatus comprising:

voltage detecting means for detecting the voltage drop (Va) across the armature circuit;

current detecting means for detecting the current (Ia) supplied to the armature;

resistance detecting means for detecting armature circuit electrical resistance (Ra);

first analog circuit means for representing, at least, the function Ia(Va - IaRa) and for providing a representative output;

means for providing detected Ia, V4 and Ra as input to said first analog circuit means;

second analog circuit means for representing, at least, the function

$$Sr\frac{[Va - IaRa]}{Vr - IrRa},$$

where Sr is the name plate rated speed of the motor, Vris the name plate rated voltage of the motor and Ir is the name plate rated current of the motor and for providing a representative output;

means for providing detected Va, Ia and Ra as input to said second analog circuit means; and

third analog circuit means for dividing said output from said first analog circuit means by said output from said second analog circuit means, and for providing a representative output;

whereby the resultant output of said third analog circuit means is a torque factor representative of the mechanical output torque delivered by the DC motor armature shaft multiplied by a constant.

4,888,997

CONTROL INPUT DEVICE

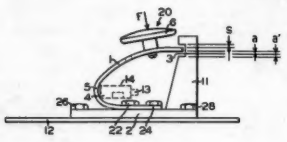
Horst Eckert, Rehburg-Loccum; Joachim Feldmann, Neustadt, and Gerhard Warendorf, Wedemark, all of Fed. Rep. of Germany, assignors to WABCO Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany

Filed Mar. 21, 1988, Ser. No. 171,095

Claims priority, application Fed. Rep. of Germany, Mar. 28, 1987, 3710256

Int. Cl.[4] G01L *1/22*

U.S. Cl. 73—862.65 **13 Claims**



1. A control input device which measures and transmits an electrical output signal that is a function of one of a load and a deflection, said control input device comprising:

(a) a base plate member;

(b) a leaf spring having a generally U-shaped bend, one leg of said leaf spring being secured to said base plate member and the other leg being free;

(c) a beam member;

(d) stop means carried by said beam member for limiting the amount of deflection of said other leg from a normal position in which said leaf spring is free of stress, said stop means comprising a recess in said beam member into which the end of said other leg of said leaf spring projects so as to lie in spaced-apart relationship with the opposing walls of said recess in said normal position thereof, thereby limiting the degree of deflection of said other leg in opposite directions from said normal position; and

(e) at least one sensing means engaging said leaf spring for providing said electrical signal having a value corresponding to the degree of bowing of said leaf spring in response

to a force F being applied at said other leg adjacent the end thereof.

4,888,998

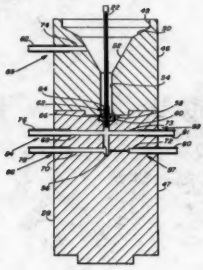
SAMPLE HANDLING SYSTEM

Edmund E. Buzza, Fullerton, and Delbert D. Jackson, Brea, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Continuation of Ser. No. 145,695, Jan. 15, 1988, abandoned, which is a continuation of Ser. No. 884,454, Jul. 11, 1986, abandoned. This application May 17, 1989, Ser. No. 355,077

Int. Cl.[4] B01L *3/02*

U.S. Cl. 73—864.21 **14 Claims**



1. A sample handling system, comprising:

a moveable fluid delivery probe having a tip and a sealing surface proximate the tip;

a sample carrying location;

a sample injection cell comprising

a body having a chamber adapted to receive the probe, the chamber including an open end and a closed end, a first portion of the chamber proximate the open end being sized to freely receive the probe tip and the sealing surface carried by the probe;

sealing means disposed between the first portion of the chamber and a second portion of the chamber for engaging the sealing surface carried by the probe and sealing the probe tip within the second portion of the chamber; and

at least two conduits in communication with the second portion of the chamber;

the system further including displacement means for moving the probe to the sample carrying location, inserting the probe tip into the sample carrying location, removing the probe tip from the sample carrying location, moving the probe to the sample injection cell, inserting the probe tip into the sample injection cell until the probe tip is in the second portion of the chamber and the sealing surface engages and seals against the sealing means, and removing the probe and probe tip from the sample injection cell.

4,888,999

TANK BOTTOM SAMPLING DEVICE

Robert J. Kozak, 412 Sheridan Ave., Roselle Park, N.J. 07204

Filed Oct. 7, 1988, Ser. No. 254,590

Int. Cl.[4] G01N *1/12, 1/08*

U.S. Cl. 73—864.63 **6 Claims**

1. A device for use in withdrawing a sample of liquid and solid material which has settled in a container bottom, which comprises:

(a) a cylindrical main body element provided with a lifting handle and a central cylindrical opening through the element, said central opening including:

i. an upper portion to accommodate a piston rod,

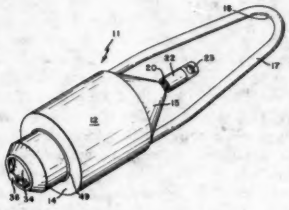
ii. a central portion having a relatively larger diameter than said upper portion and comprising a liquid sample chamber; and

iii. a restriction at the bottom of the sample chamber against which a piston head abuts;

(b) a piston assembly positioned in said central opening, said piston assembly, including:

i. an upper rod segment which is slidably contained in the upper portion of the opening in the main body and contains contiguous to the top means to secure thereto a suspending line;

ii. a piston head formed at a lower part of said piston rod and including an annular abutting portion which engages the restriction at the bottom of the sample chamber and limits the upward movement of the piston in the central opening;



iii. an annular recess to accommodate an "O" ring formed in said piston head below said abutting portion, and an "O" ring contained therein; and

iv. an extension depending below said annular recess and devised to engage a tank bottom from which a liquid sample is to be taken; and

(c) a piston retaining sleeve with an interior bore tapering to a narrower interior opening secured at the bottom of said main body for receiving the piston head within the sleeve to provide a sealing engagement between the sleeve interior and the "O" ring of said piston head when said piston is at the lower position of its stroke.

4,889,000

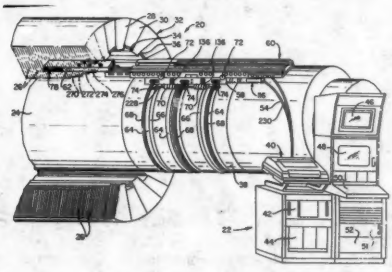
ELECTRIC GENERATOR INSPECTION SYSTEM AND MOTOR CONTROLLER

Hamedo A. Jaafar, Westtown; Karl A. Katzor, West Goshen; Wilbert B. Rethage, Apollo; Gerard A. Pompa, Cheswick; George F. Dailey, Plum, and Paul Guenther, Aston, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 13,478, Feb. 11, 1987, abandoned. This application Nov. 23, 1988, Ser. No. 277,472

Int. Cl.[4] G01N *3/08*; H04N *7/18*

U.S. Cl. 73—865.8 **9 Claims**



1. A system for inspecting an electric generator comprising:

apparatus for inspecting and providing information pertaining to the tightness of the stator coil wedges of the generator;

apparatus for inspecting and providing information pertaining to the electrical integrity of the stator lamination insulation;

apparatus for visually and remotely inspecting the interior surfaces of the stator and rotor;

motor propelled carriage means adapted to travel along the slots defined by the stator of the generator for delivering each said apparatus to the site of inspection, and for retrieving said apparatus therefrom; and

means for causing each said apparatus to conduct an inspection at an inspection site.

5. An inspection system for an electric generator comprising:

a carriage adapted to travel along the slots defined by the stator of the generator;

apparatus mounted on said carriage for inspecting and providing information pertaining to the tightness of the stator coil wedges of the generator, for inspecting and providing information pertaining to the electrical integrity of the stator lamination insulation of the generator, and for visually and remotely inspecting the interior surfaces of the stator and of the rotor of the generator;

means for moving said carriage along the stator slots to sites of inspection;

an indexer adapted to be releasably secured to the rotor of the generator, said carriage and said indexer being adapted to permit said carriage to be received and retained by said indexer when said carriage exits a slot;

means for aligning said indexer with each slot to permit said carriage to enter the slot when said carriage travels out of retention of said indexer;

means for moving the indexer around the circumference of the rotor to deliver said carriage to a desired slot; and

means for causing said apparatus to conduct an inspection at an inspection site.

4,889,001

CALIBRATION OF FLUID DELIVERY EQUIPMENT

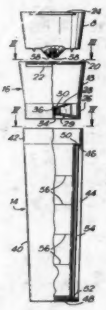
David C. Gill, Keynsham, United Kingdom, assignor to Nomix Manufacturing Company Ltd., Staple Hill, United Kingdom

Filed Jun. 29, 1988, Ser. No. 213,255

Claims priority, application United Kingdom, Jun. 29, 1987, 8715222

Int. Cl.[4] G01F *13/00, 25/00*

U.S. Cl. 73—865.9 **23 Claims**



1. A calibration device for use with fluid delivery equipment comprising an outlet through which, in normal use of the equipment, fluid is discharged into the ambient surroundings, the device comprising a vessel which is provided with connection means for releasably connecting the vessel in a fluid-tight manner to the delivery equipment with the outlet in communication with the interior of the vessel, the device further comprising pressure equalizing means for equalizing the pressure inside and outside the vessel as fluid flows into the vessel through the outlet, and as fluid returns to the equipment from the vessel through the outlet.

4,889,002

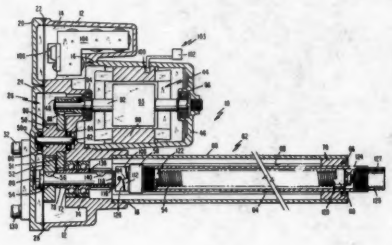
ANTI-LOCKUP DRIVE MECHANISM FOR A POSITION CONTROLLED LINEAR ACTUATOR

William F. Abraham, Lancaster, N.Y., assignor to Brunswick Valve & Control, Inc., Houston, Tex.

Continuation of Ser. No. 902,424, Aug. 28, 1986, abandoned, which is a continuation-in-part of Ser. No. 733,633, May 13, 1985, Pat. No. 4,712,441. This application Apr. 11, 1988, Ser. No. 180,161

Int. Cl.[4] F16D *3/10*

U.S. Cl. 74—89.15 **12 Claims**



1. A linear actuator comprising:

a housing;

a drive screw rotatably supported within said housing;

a drive nut in threaded engagement with said drive screw;

a body tube assembly connected to said housing and positioned about said drive screw, said body tube assembly containing reaction force surfaces for preventing rotation of said drive nut;

an extendible member having a load connecting member on its free end and having the opposite end thereof connected to a drive nut, said extendible member adapted for axial movement so as to extend out of said body tube,

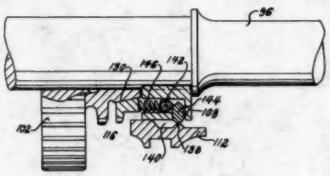
drive means including an electric drive motor containing windings for rotating said drive screw; said drive means including intermediate gearing means for transmitting rotative torque output from said electric drive motor to rotate said drive screw, said intermediate gearing means including a lost motion arrangement means for delaying rotation of said drive screw for a predetermined interval during which a drive pinion of said electric drive motor rotates through a predetermined angular interval, said lost motion arrangement means enabling said drive pinion to attain a rotational speed approaching a predetermined operating speed before imparting rotative torque to drive said drive screw through the intermediate gearing means, said lost motion arrangement preventing lockup of the electric motor and over-heating of the motor windings tending to occur when an output load is connected to the load connecting member, wherein said intermediate gearing means includes a first intermediate gear and a second intermediate gear both mounted intermediate the electric motor and the drive screw, said first intermediate gear in contact with a drive pinion and said second intermediate gear connected to transmit rotative force to the drive screw, said lost motion arrangement means being formed between said first and second intermediate gears to enable initial rotation of said first intermediate gear under the driving force of the drive pinion before imparting rotative force to the second intermediate gear and thereby the drive screw.

4,889,003

MANUAL TRANSMISSION GEARSET BRAKE FOR SYNCHRONIZED ENGAGEMENT OF A SLIDING GEAR

Donald R. Rietsch, Howell, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 21, 1987, Ser. No. 135,887
Int. Cl.[4] F16H *3/38*; F16D *11/04, 11/10, 13/22*
U.S. Cl. 74—339 7 Claims



1. A device for synchronizing and connecting components of a transmission, comprising:

a gear rotatably supported on a shaft;

shift control means moveable along the axis of the shaft from a neutral position in a first direction and in a second direction opposite the first direction;

first means supported on the shaft, moveable toward the gear for synchronizing the rotational speeds of the gear and shaft and for drivably connecting the gear and shaft in response to movement of said shift control means in said first direction; and

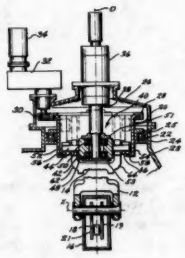
second means for converting movement of said shift control means in the second direction to movement of the first means toward the gear and for synchronizing the rotational speeds of the gear and shaft, no driving connection being established between the gear and shaft when movement of said shift control means in the second direction is completed.

4,889,004

APPARATUS FOR DRIVING AN OSCILLATING SPOUT

Pierre Mailliet, Howald; Emile Lonardi, Bascharage, and Giovanni Cimenti, Fentange, all of Luxembourg, assignors to Paul Wurth S.A., Luxembourg

Filed Nov. 7, 1984, Ser. No. 669,260
Claims priority, application Luxembourg, Nov. 7, 1983, 85078
Int. Cl.[4] B05B *3/02*; G05G *11/00*; F27B *1/20*
U.S. Cl. 74—479 15 Claims



1. Apparatus for driving and controlling the movement of an oscillating spout capable of movement about two orthogonal axes under the direction of a control arm having the same degrees of freedom of movement as the spout comprising:

a driving rod capable of axial displacement;

an intermediate lever arm;

pivotal connecting means connecting a first end of said intermediate lever arm to said driving rod;

a control arm to be connecdted to an oscillating spout;

a first end of said control arem being connected to a second end of said intermediate lever arm via joint means;

rotary housing means, said housing means including transmission means associated with first driving means to effect rotation thereof;

said driving rod being coaxial with said rotary housing means and being associated at a first end with second driving means for axial displacement; and

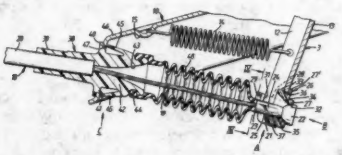
said pivotal connecting means engaged via bearing means to a second end of said driving rod wherein said pivotal connecting means is displaced axially with said driving rod, and wherein said pivotal connecting means is associated with said rotary housing means to freely rotate therewith.

4,889,005

REMOTE CONTROL MECHANISMS

David J. Crack, Chelmsford, England, assignor to Morse Controls Limited, Basildon, England

Filed Mar. 23, 1988, Ser. No. 172,276
Claims priority, application United Kingdom, Apr. 6, 1987, 8708166
Int. Cl.[4] F16C *1/12*
U.S. Cl. 74—501.6 19 Claims



1. A remote control mechanism, comprising:

a stationary member;

a movable member having an aperture and a communicating slot from one edge of the movable to that aperature;

a cable having a core translatable within a cable casing;

first resilently deformable means for engaging the cable casing with respect to the stationary member; and

second resiliently deformable means for interconnecting the cable core to the movable member,

wherein the second resiliently deformable means comprises a retaining clip having a lug fitting in the communicating slot in the movable member and and aperture boss mounted in the aperture in the movable member with resiliently deformable arm means extending from the apertured boss for snap fitting the retaining clip to the movable member,

wherein further the cable core enters transversely through the communicating slot into the aperture in the movable member and through the retaining clip, the retaining clip then is snap fit into the movable member to retain the cable core with the lug of the retaining clip fitted in the communicating slot to prevent transverse withdrawal of the cable core with respect to the aperture in the movable member.

4,889,006

ENGINE SPEED CONTROL CABLE CLIP ATTACHMENT

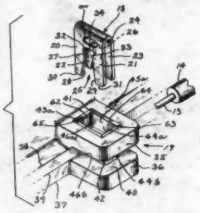
Edmund C. Kolinske, Big Bend, and Arvo F. Uuskallio, Hartland, both of Wis., assignors to Briggs & Stratton Corporation, Wauwatosa, Wis.

Filed Mar. 24, 1988, Ser. No. 173,169
Int. Cl.[4] F16C *1/06*
U.S. Cl. 74—502.4 23 Claims

1. In an internal combustion engine including a speed control

lever on the engine and a remote speed control cable for moving said engine speed control lever to control the speed of the engine, said remote speed control cable defining a longitudinal axis and having a control wire connected at one end to a remote speed control lever and at its other end to said engine speed control lever and a casing surrounding said control wire slidable receiving said wire therein, the improvement comprising a casing clamp for fixedly mounting said casing on the engine to permit sliding movement of said control wire relative to said casing, said casing clamp comprising:

a clip member removably attachable to said casing including a flat body extending substantially perpendicular to the longitudinal axis of said cable, said body having a head



end and bifurcated end defining a pair of legs having a cable-receiving opening therebetween dimensioned to tightly engage the casing of said cable; and

mounting means on the engine for receiving and removable mounting said clip member thereon, said mounting means includes first abutment means for preventing movement of said body axially with respect to said control cable axis, second abutment means for preventing movement of said body laterally with respect to said control cable axis, and said mounting means comprises a bracket projecting from said engine including a pair of spaced apart support members having aligned clip-receiving openings formed therein, said clip-receiving openings dimensioned to snugly receive said clip member.

4,889,007

ADJUSTING DEVICE FOR A VEHICLE PARKING BRAKE

Ernst Senft, Möglingen; Herbert Klemmer, Nürtingen; Ullrich Uhl, Aalen; Emil Näumann, Reichenbach, and Nikolaus Schefcsik, Schwaikheim, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Jun. 21, 1989, Ser. No. 369,186

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1988, 3822436

Int. Cl.[4] F16C *1/10*; G05G *5/06*; F16D *65/38*

U.S. Cl. 74—506 **8 Claims**

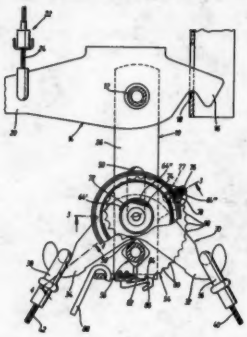
1. Adjusting device for an automatic compensation of cable strand elongations in a vehicle parking brake comprising;

an elongate traction plate means actuable by a traction cable of an actuating device,

an integrally constructed cable yoke means having end pieces projecting laterally from the traction plate means, each end piece for retaining a cable strand, the cable yoke means having a bearing axis guided slidably along the traction plate means to tension each cable strand,

a bracing element anchored on the traction plate means, and

a tensioning means having a permanently operative pretensioned spring braced against the traction plate means to bias the cable yoke means in a tensioning adjustment direction, the tensioning means having a disc cam means which is arranged on the bearing axis in common with the integrally constructed cable yoke means and is rotatable by the spring as slack develops in at least one of each cable strand, the disc cam means having catch recesses along its circumference which cooperate with the bracing element anchored on the traction plate means, a spacing of the catch recesses from the bearing axis increases in the tensioning adjustment direction as the disc cam means is rotated.



4,889,008

APPARATUS FOR DRIVING AN OSCILLATING SPOUT

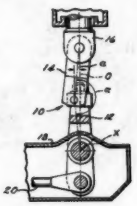
Edouard Legille, Luxembourg, and Emile Lonardi, Bascharage, both of Luxembourg, assignors to Paul Wurth S.A., Luxembourg, Luxembourg

Continuation of Ser. No. 504,464, Jun. 15, 1983, abandoned. This application Dec. 30, 1985, Ser. No. 814,326

Claims priority, application Luxembourg, Jun. 24, 1982, 84225

Int. Cl.[4] G05G *1/04*; F16D *3/00*

U.S. Cl. 74—520 **8 Claims**



1. Apparatus for controlling the movement of an oscillating spout comprising;

a driving rod capable of rotation about its longitudinal axis and capable of axial displacement;

an intermediate lever arm having a first end and a second end and connected at said first end to said driving rod by a pivotal connecting means;

a control arm adapted for connection to an oscillating spout, said control arm including a longitudinal axis; and

universal joint means pivotably connecting a first end of said control arm to said second end of said intermediate lever arm and defining an angle of alignment between said control arm and said lever arm, said universal joint means being pivotably connected to said longitudinal axis of said control arm;

said universal joint means including means to offset said angle of alignment between said control arm and said lever arm wherein said angle is less than 180 degrees when said control arm is vertically aligned with said driving rod, said offset means being located on said universal joint

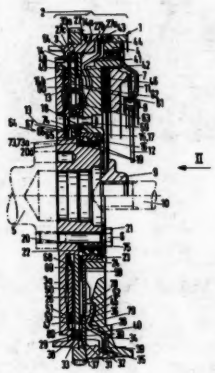
means in a position which is laterally offset from said longitudinal axis of said control arm.

4,889,009

TORQUE TRANSMITTING MECHANISM

Oswald Friedmann, Lichtenau, and Hans-Dieter Elison, Offenburg, both of Fed. Rep. of Germany, assignors to LUK Lamellen und Kupplungsbau GmbH, Bühl, Fed. Rep. of Germany

Filed Dec. 18, 1986, Ser. No. 943,676
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1985, 3544949; Dec. 21, 1985, 3545724
Int. Cl.[4] F16F *15/10*
U.S. Cl. 74—574 42 Claims



1. A mechanism for transmitting and for absorbing variations of torque, comprising a first flywheel which is rotatable relative to the engine and second flywheel which is rotatable relative to the first flywheel and is connectable to the input member of a change-speed transmission in a motor vehicle, and a plurality of dampers including three dampers arranged to operate between said flywheels one after the other, each of said dampers including at least one input element and at least one output element, one of the input and output elements of at least two of said dampers being rotatable relative to said flywheels and further comprising means for centering said rotatable elements relative to one of said flywheels, said rotatable elements being continuous ring-shaped.

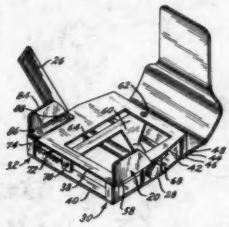
4,889,010

BICYCLE SAFETY TOE CLIP

Edward A. Ross, 15240-½ Dickens St., Sherman Oaks, Calif. 91403

Continuation of Ser. No. 660,027, Oct. 12, 1984, abandoned. This application Aug. 25, 1987, Ser. No. 90,434
Int. Cl.[4] G05G *1/14*
U.S. Cl. 74—594.6 2 Claims

1. A bicycle toe clip comprising:
a pedal comprising a bearing surface and a front;
a hinge mounted to the front of the pedal;
an upper support for supporting a rider's foot, comprising a front surface extending across the front of the pedal having an edge coupled to the hinge, an upper surface for extending over the pedal, and an opening in the edge;
a hook means for interlocking with the opening comprising a pivot point about which the hook means pivots;
a pivot for movably anchoring the hook means; and



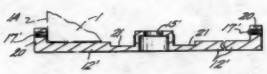
a flanged portion coupled to the pivot point for pivoting the hook means upon movement of the flanged portion.

4,889,011

DETACHABLE FLYWHEEL WEIGHTS FOR ALTERING MOTORCYCLE ENGINE PERFORMANCE

Charles W. Steahly, 9950 SE. Bullrun Rd., Corbett, Oreg. 97019

Filed Nov. 7, 1988, Ser. No. 268,038
Int. Cl.[4] F16C *3/04;* F16F *15/22*
U.S. Cl. 74—604 9 Claims



8. In combination,
a crankshaft having an externally threaded end segment,
a flywheel on said end segment, and
a flywheel weight of disk shape and having centrally disposed screw threads for threaded engagement with said threaded end segment of said crankshaft whereby the flywheel weight serves to supplement the flywheel.

4,889,012

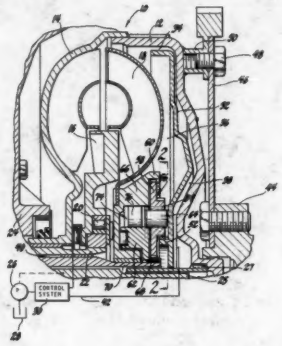
DAMPING ASSEMBLY FOR A TORQUE CONVERTER CLUTCH

Dennis C. Dull, Arcanum, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 93,198, Sep. 4, 1987, abandoned. This application Oct. 6, 1988, Ser. No. 254,065
Int. Cl.[4] F16H *47/08, 3/44*
U.S. Cl. 74—730 3 Claims

1. A turbine damped torque converter and clutch comprising: a pressure plate; a torque converter turbine; a torque converter impeller; means including a control chamber for said pressure plate means for controlling the apply and release of said clutch for engaging said clutch with said impeller; a torque converter output shaft; a planetary gear arrangement including an input gear drivingly connected with said pressure plate, a reaction gear drivingly connected with said turbine, an output member drivingly connected with said output shaft and pinion gear means meshing with said input gear and said reaction gear for drivingly interconnecting said turbine and said pressure

plate at a drive ratio of said turbine to said pressure plate of less than 1:1; and one-way drive means disposed between said



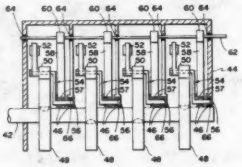
turbine and said output shaft for preventing the turbine from overrunning said output shaft.

4,889,013

TORQUE CONVERTER AND ASSEMBLY UTILIZING SAME

Vincent E. Pitassi, 20 Barrington Ave., Barrington, R.I. 02806, and Angel Fernandez, Mt. Clemens, Mich., assignors to Vincent E. Pitassi, Barrington, R.I.

Filed Feb. 29, 1988, Ser. No. 161,958
Int. Cl.[4] F16H *3/74*
U.S. Cl. 74—752 F **6 Claims**



1. A torque converter for converting a first torque to a second torque, the converter comprising:

a housing;

an input shaft having the first torque;

a driving sun gear rotatable about a first axis, the input shaft being coupled to the sun gear;

a driven carrier including a shaft portion rotatable about said first axis;

a first planetary shaft mounted on said driven carrier coaxially with a second axis parallel to the first axis;

a first planetary gear meshing with and driven by the sun gear and mounted on the first planetary shaft so that the first planetary gear is rotatable about said second axis;

a fist mass eccentric to said second axis and coupled to said first planetary gear for rotation together about the second axis;

first and second unidirectional clutches connected to the shaft portion of said driven carrier and operating in opposite directions;

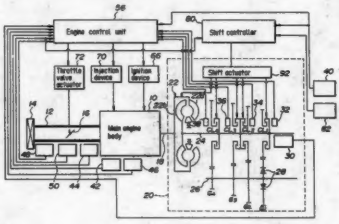
an output torque shaft, one if the first and second unidirectional clutches being coupled to the output torque shaft to transmit the second torque thereto in a pulsating fashion and to permit continuous rotation of the output torque shaft and the other one of the first and second unidirectional clutches being connected to the housing to transmit an algebraic addition of the first and second torques together.

4,889,014

SYSTEM FOR CONTROLLING AN INTERNAL COMBUSTION ENGINE FOR MOTOR VEHICLES EQUIPPED WITH AN AUTOMATIC TRANSMISSION

Takahiro Iwata, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 23, 1988, Ser. No. 290,302
Claims priority, application Japan, Dec. 29, 1987, 62-336668; Dec. 29, 1987, 62-336669
Int. Cl.[4] B60K *41/18*
U.S. Cl. 74—858 **6 Claims**



1. A system for controlling an internal combustion engine for motor vehicles equipped with an automatic transmission, comprising;

first means for detecting an operating condition of the engine;

second means for receiving an output signal of the first means to determine an output force generated by the engine at the detected operating condition;

third means for detecting an operating condition of the transmission;

fourth means for receiving an output signal of the third means to determine a transmissible force of the transmission; and

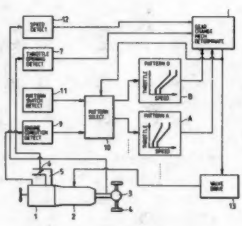
control means for receiving output signals of the second and fourth means, the control means including comparison means comparing the signals with each other and controlling the engine based upon the comparison result.

4,889,015

AUTOMATIC TRANSMISSION CONTROL DEVICE

Shigeki Kondo, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 30, 1988, Ser. No. 213,859
Claims priority, application Japan, Jul. 2, 1987, 62-16717487
Int. Cl.[4] B60K *41/18*
U.S. Cl. 74—866 **1 Claim**



1. A control device for an automatic transmission (2) includ-

ing a gear change mechanism having at least two speed shift patterns (A, B) and coupled to an engine (1) for automatically converting an output rotational speed of the engine to a driving rotational speed comprising: a vehicle running speed detector (12), a throttle opening detector (7), an engine characteristics detector (9), a gear change mechanism determination means (8) responsive to outputs of said running speed detector and said throttle opening detector, as gear shift pattern switching detector (11) for detecting a switching between said gear shift patterns and providing a switching output signal when a gear shift pattern switching occurs, and a gear shift pattern selector (10) responsive to outputs of said gear shift pattern switching detector and said engine characteristics detector, wherein said gear change mechanism determination means is responsive to the switching output signal from said gear shift pattern switching detector or an output of said engine characteristics detector to: (a) cause said shift pattern selector to select either one of said shift patterns as a next shift pattern according to the outputs of said throttle opening detector and said speed detector, (b) use a preceding one of said shift patterns before said gear change mechanism of said automatic transmission is switched to the next shift pattern to thereby temporarily delay a gear change and, (c) thereafter, to switch said gear change mechanism to said next shift pattern.

4,889,016

HYDRAULIC SERVO REGULATING SYSTEMS IN AN AUTOMATIC TRANSMISSION

Yoshinari Kuwayama, Tokoname; Fumitomo Yokoyama, Anjo, and Masakatsu Miura, Kariya, all of Japan, assignors to Aisin-Warner Kabushiki Kaisha, Aichi, Japan

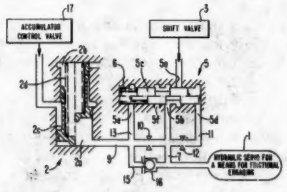
PCT No. PCT/JP87/00455, § 371 Date Mar. 1, 1988, § 102(e) Date Mar. 1, 1988, PCT Pub. No. WO88/00305, PCT Pub. Date Jan. 14, 1988

PCT Filed Jun. 30, 1987, Ser. No. 172,722

Claims priority, application Japan, Jul. 1, 1986, 61-154696

Int. Cl.[4] B60K *41/04*

U.S. Cl. 74—868 **2 Claims**



1. In an automatic transmission of a vehicle having a transmission unit through which power is transmitted in a respective one of power transmitting paths defined therethrough, frictional engaging means operatively connected to the transmission unit for selecting the power transmitting path through which power is transmitted in the transmission unit, hydraulic servos operatively connected to the frictional engaging means for operating or releasing or for engaging or disengaging the frictional engaging means, accumulators operatively hydraulically connected to the hydraulic servos, and a plurality of shift valves operatively hydraulically connected to the hydraulic servos and a source of line pressure and which shift valves are movable between respective positions at which the line pressure is supplied toward the servos and respective positions at which the supply of line pressure is interrupted, a hydraulic servo regulating system comprising:

a regulator valve operatively connected to one of the hydraulic servos, one of the accumulators and one of the shift valves,

said regulator valve having an application port in hydraulic communication with said one of the shift valves, a regulating port, a spool interposed between said application port and said regulating port and movable between a position at which said ports are open to one another and a position at which said ports are closed to each other, a first feedback port open to one end of said spool and through which feedback pressure passes to act on said spool at said one end thereof, a second feedback port open to another end of said spool and through which feedback pressure passes to act on said spool at said another end thereof, a spring means connected to said spool for exerting an urging force on said spool at said another end thereof, and a drain port openable and closable to said regulating port;

the system defining a first oil passage placing said regulating port in hydraulic communication with said one of said hydraulic servos, a second oil passage open to said first oil passage and placing said regulating port in hydraulic communication with said one of said accumulators, a third oil passage open to said first oil passage and placing said regulating port in hydraulic communication with said first feedback port, a fourth oil passage extending between and open to said second oil passage and said first oil passage, and a branch oil passage open to said second oil passage and placing said regulating port in hydraulic communication with said second feedback port;

a first orifice disposed in said second oil passage;

a second orifice disposed in said third oil passage; and

a check valve disposed in said fourth oil passage and allowing oil to flow in said fourth oil passage from said second oil passage toward said first oil passage.

4,889,017

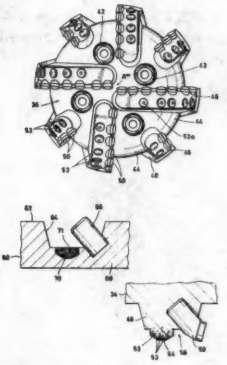
ROTARY DRILL BIT FOR USE IN DRILLING HOLES IN SUBSURFACE EARTH FORMATIONS

John Fuller, Penzance, and Joseph A. Gasan, Stroud, both of England, assignors to 501 Reed Tool Co., Ltd., London, England

Continuation-in-part of Ser. No. 118,604, Nov. 9, 1987, Pat. No. 4,823,892, which is a division of Ser. No. 754,506, Jul. 12, 1985, Pat. No. 4,718,505. This application Apr. 29, 1988, Ser. No. 187,811

Int. Cl.[4] E21B *10/46*

U.S. Cl. 76—108 A **10 Claims**



1. A method of making a drill bit for drilling holes in subsurface earth formations comprising the steps of:

providing a mold configured to form a substantial body portion of said bit and having a first plurality of recesses therein;

placing in each of said recesses a quantity of spacer material having a plurality of superhard particles dispersed therein through a significant depth measured from the bottom of the recess;

forming said bit body portion in said mold of a tungsten carbide matrix so as to cause said matrix to become integrated with said spacer material and to form therewith abrasive protuberances projecting outwardly from the adjacent surfaces of said bit body portion;

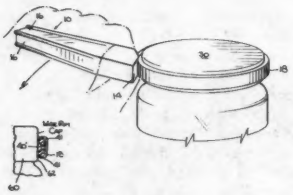
and mounting a plurality of preform cutting structures in said body portion in spaced leading relation to major operative portions of respective ones of said protuberances.

4,889,018

LID REMOVER

Roy E. Shaffer, 2500 Glenmary St. - Apt. 3, Louisville, Ky. 40204

Filed Nov. 1, 1988, Ser. No. 265,506
Int. Cl.[4] B67B *7/00*
U.S. Cl. 81—3.43 **3 Claims**



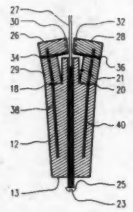
1. In a lid opener of the type having loop means attached at one or both ends to handle means, said loop means adapted to encircle and be cinched against the lid by the handle means and to be turned therewith to screw the lid loose from a container, the improvement for accommodating wide and narrow rim lids which comprises strap loop means having a gripping surface for engaging the rim of wide and narrow lids and a recessed groove which is capable of receiving the outwardly extending skirt portion of a narrow lid rim thereby allowing the gripping surface to securely engage wide and narrow lids.

4,889,019

DISPOSABLE UNIFORM WIRE STRIPPER

Steven C. Thompson, 402 Kent Dr., Eufaula, Ala. 36027

Filed Feb. 19, 1988, Ser. No. 162,029
Int. Cl.[4] H02G *1/12*
U.S. Cl. 81—9.4 **1 Claim**



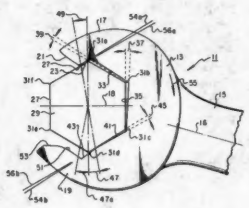
1. A device for stripping insulation from electrical wire comprising an elongated body having an upper and a lower end, said body having a threaded bore extending longitudinally through the center thereof, an adjustable screw extending into said bore from the lower to the upper end of said body and having a length substantially equal to the length of said bore, said body having a wide first portion adjacent the lower end and a narrower second end adjacent the upper end, shoulders formed on opposing sides of said body where said first and second portions meet, said shoulders being substantially planar surfaces extending from the longitudinal sides of said second body portion to the longitudinal sides of said first body portion, a movable blade housing located on each side of said body, each blade housing being connected to one of said shoulders by a leaf spring, a lower portion of each blade housing having a lower recess such that each recess may receive half of said second body portion on either side of said bore, each blade housing further including a blade having an edge extending into said recess, an upper portion of each blade housing having a longitudinally extending slot along one side, such that when said second body portion is received within said blade housing recesses, said upper blade housing portions are brought into abutting contact and said slots form a wire receiving hole longitudinally aligned with said bore and said blade edges are positioned adjacent to said bore at the upper end of said body to perform a wire stripping operation.

4,889,020

OPEN END RATCHET TYPE WRENCH

David R. Baker, 7254 Laurie Dr., Fort Worth, Tex. 76112

Filed Aug. 31, 1987, Ser. No. 91,099
Int. Cl.[4] B25B *13/04*
U.S. Cl. 81—119 **8 Claims**



1. A wrench for use with a hexagonal nut, comprising in combination:

a jaw joined to a shank and having upper and lower jaw portions rigidly formed together so as to be immovable relative to each other and separated from each other by a center line of the jaw;

an upper primary drive face located on the upper jaw portion for engaging a side of the nut to apply torque only when the wrench is in a primary drive position;

an upper secondary drive surface located on the upper jaw portion adjacent the upper primary drive face for engaging a side of the nut only when the wrench is in a secondary drive position, the shank being located in the secondary drive position substantially less than 60 degrees in reverse rotation relative to the nut from the position of the shank while in the primary drive position;

a lower primary drive face in the lower jaw portion, opposite from and parallel to the upper primary drive face, for engaging a side of the nut opposite from the side engaged by the upper primary drive face when the wrench is in the primary drive position, the lower primary drive face lying at an acute angle relative to the center line of the jaw;

a lower secondary drive face located forward of the lower primary drive face, the lower secondary drive face being substantially parallel to the center line of the jaw, the lower secondary drive face adapted to engage a side of the nut opposite the side engaged by the upper secondary drive surface when the wrench is in a secondary drive position;

a rear stop face at the junction of the upper and lower jaw portions, for contacting the nut when the wrench is in the primary drive position;

an upper stop face located forward of the rear stop face on the upper jaw;

a lower stop face located between the lower primary and

secondary drive faces and opposite the upper stop face; and

the distance between the upper and lower stop faces being greater than a point-to-point diameter of the nut, to enable the wrench to be rotated between drive positions without removing the wrench from the nut.

4,889,021

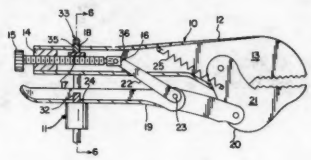
CLAMPING PLIER WITH LOCKING MEANS

Joseph L. Morrison, 17 Glasgow Ter., Mahwah, N.J. 07430

Filed Jan. 6, 1989, Ser. No. 294,361

Int. Cl.[4] B25B 7/14

U.S. Cl. 81—325 **1 Claim**



1. A locking device comprising:

(a) a stationary handle having a stationary jaw at one extremity and, at the opposite extremity, a threaded adjustment screw that enters said handle and is adapted to advance toward said stationary jaw,

(b) brake means for preventing movement of said adjustment screw disposed within said stationary handle and adapted to contact said adjustment screw,

(c) a first aperture in said stationary handle adjacent said brake means,

(d) a connecting lever having first and second extremities, said first extremity pivotably associated with said adjustment screw,

(e) a moveable handle pivotably joined to the second extremity of said connecting lever, and adapted to move toward and away from said stationary handle,

(f) a moveable jaw pivotably associated with said moveable handle and adapted to interact with the stationary jaw when the handles are brought together in a manner whereby the spacing between the jaws is determined by said adjustment screw,

(g) a second aperture in said movable handle and positioned so as to be in substantial alignment with said first aperture when the movable handle is close to said stationary handle, and

(B) a padlock comprised of:

(h) a lock case having an upper extremity, a lower extremity having key-receiving means, a key operated locking means, and two parallel spaced apart channels extending between said upper and lower extremities and interactive with said locking means,

(i) a first stub centrally attached to said upper extremity in parallel orientation with said channels, and

(j) a U-shaped shackle having two parallel arms adapted to adjustably penetrate said channels, and a second stub emergent from said shackle and centered between said arms and parallel thereto and coaxially aligned with said first stub,

(k) said padlock being disposed upon said clamping pliers in a manner such that said shackle arms embrace said handles, whereby

(C) when the handles are at their closest approach, constituting the locked state of the pliers, the shackle may be adjustably pushed through the lock case until the stubs enter said apertures, said first stub further abutting against said brake means to prevent movement of said adjustment screw.

4,889,022

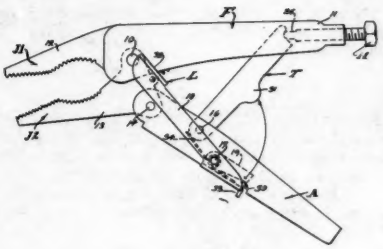
QUICK RELEASABLE VICE-GRIP PLIERS

Thomas P. Pevlani, 16550 Bushard St., Fountain Valley, Calif. 92708

Filed Mar. 11, 1988, Ser. No. 166,925

Int. Cl.[4] B25B 7/12

U.S. Cl. 81—368 **5 Claims**



1. A quick releasable vice grip pliers for mechanical engagement onto a work piece, and including;

an elongated frame disposed about a first pivot pin and comprised of a handle portion extending rearwardly and a lever arm extending forwardly,

an actuating lever carried by the pivot pin and extending rearwardly therefrom and complementary to and underlying the handle portion of the frame and from which a lever arm extends forwardly and complementary to and underlying the lever arm of the frame,

a toggle link adapted so as to be releasably set by adjustment means in an adjusted over-center position and operable between the handle portion of the frame and the actuating lever to force the two arms into spaced relationship,

a release lever carried by a second pivot pin on the actuating lever and having a lever arm extending forwardly with a pad at the exterior of the frame and positioned in the vicinity of the first pivot pin for manual depression and having a lever arm extending rearwardly and engageable beneath the toggle link to left the same from said over-center position,

and opposed jaws carried by the complementary lever arms at the ends thereof remote from the first pivot pin for adjusted engagement with opposite sides of a work piece placed therebetween.

4,889,023

TUBE TRUNCATION APPARATUS AND METHOD

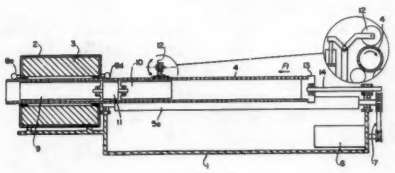
Jean-Paul Languillat, Vallieres par Thorigny-sur-Oreuse, France, assignor to Lhomme S.A., Pont-sur-Yonne, France

Filed Oct. 29, 1986, Ser. No. 924,443

Claims priority, application France, Oct. 30, 1985, 85 16135

Int. Cl.[4] B23B 3/04

U.S. Cl. 82—92 **4 Claims**



1. Apparatus for truncating tubes, said apparatus comprising at least one knife, said knife having a cutting portion which is adapted to cooperate with counter-knife which is positioned

along the interior of a tube to be cut by said knife, said counter-knife being connected to a magnetizable core by a rigid element and for permitting free rotation of said counter-knife with respect to said magnetizable core, said apparatus including magnetic induction means for creating a magnetic field in the core, across said tube, for changing the longitudinal position of said core and said counter-knife within said tube, relative to the tube as the tube moves, said apparatus further comprising means for moving said tube, means for cutting said tube transversely with aid knife, and means for fixing said knife in a longitudinal position with respect to said tube when said tube is cut by said knife.

4,889,024

GUIDE-BAR DEVICE FOR A SINGLE SPINDLE LATHE

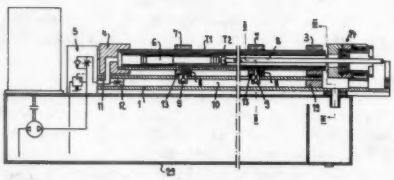
Markus Geiser, Péry, and Pierre Juillerat, Moutier, both of Switzerland, assignors to Sameca SA, Lamboing, Switzerland

Continuation of Ser. No. 886,604, Jul. 18, 1986, abandoned. This application Sep. 29, 1988, Ser. No. 251,992

Claims priority, application Switzerland, Oct. 9, 1985, 03911/85

Int. Cl.[4] B23B *13/00*

U.S. Cl. 82—127 **25 Claims**



1. A guide bar device for a single spindle lathe, comprising:

a guiding means for rotatably supporting a length of bar stock, said guiding means comprising a fixed tube and a free tube disposed inside said fixed tube, said free tube being adapted to rotatably receive a length of bar stock herein;

a sectional carrier means for supporting said guiding means, said sectional carrier means being removably secured to said guiding means;

a push-piston means, at least partially disposed in said guiding means, for controlling advancement of the bar stock;

an injection means, hydraulically coupled to said push-piston means, for distributing fluid, said injection means comprising:

a first means for supplying pressurized fluid to said free tube and said fixed tube whereby a first hydrodynamic bearing is created between said bar stock and said free tube and a second hydrodynamic bearing is created between said free tube and said fixed tube, said first means comprising:

a second means for supplying pressurized fluid to a first end of said push-piston means; and

a distribution channel means, formed in said sectional carrier means, for distributing pressurized fluid to said guiding means; and

a return channel means for returning fluid from said guiding means to said injection means.

4,889,025

HIGH IMPACT RESISTANT CARBIDE TIP FOR A CIRCULAR SAW

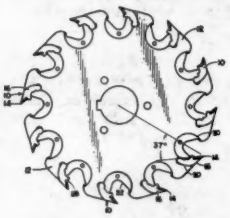
Kenneth L. Collett, 502 N. Main St., Berryville, Ark. 72616

Filed May 23, 1988, Ser. No. 197,284

Int. Cl.[4] B27B *33/08*

U.S. Cl. 83—835 **4 Claims**

1. An improved cutting tooth for a circular saw of the type commonly used to cut raw logs comprising a crescent shaped steel bit and a wedge shaped cutting tip affixed to an upper portion of said bit wherein said cutting tip is composed of a high impact resistant carbide alloy consisting essentially of a



mixture of 83.5% tungsten carbide, 16% cobalt and 0.5% tantalum carbide, said bit being disposed in said circular saw so that said cutting tip has a hook with a positive angle of about 37° with respect to the radius of said saw.

4,889,026

SEQUENCER UNIT OF ELECTRONIC MUSICAL INSTRUMENT

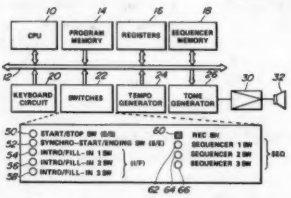
Yasunao Abe, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Filed May 26, 1988, Ser. No. 199,363

Claims priority, application Japan, May 29, 1987, 62-131081; May 29, 1987, 62-131080; May 29, 1987, 62-131079; May 29, 1987, 62-131082

Int. Cl.[4] G10H *1/38, 1/40, 7/00*

U.S. Cl. 84—611 **20 Claims**



4. A sequencer unit for an electronic musical instrument comprising:

(a) memory means for storing performance data;

(b) writing means for writing said performance data into said memory means;

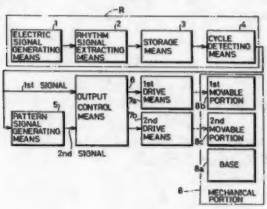
(c) means for generating a tempo clock; and

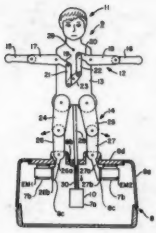
(d) reading means for sequentially reading out said performance data from said memory means based on said tempo clock, said reading means reading out said performance data in accordance with a predetermined order corresponding to an end timing for writing said performance data into said memory means when the last of said performance data written in said memory means is located in the middle of a bar, wherein a non-tone period corresponding to the time between said end timing for writing said performance data into said memory means and the end of said bar is eliminated in a reproduction state so that performance date is continuously and repeatedly read out from said memory means.

4,889,027
RHYTHM RECOGNIZING APPARATUS AND RESPONSIVE TOY

Gunpei Yokoi, Kyoto, Japan, assignor to Nintendo Co., Ltd., Kyoto, Japan

Filed Dec. 22, 1986, Ser. No. 945,386
Claims priority, application Japan, Dec. 26, 1985, 60-294981; Jan. 21, 1986, 61-11570
Int. Cl.[4] G10F 1/00; A63H 5/00
U.S. Cl. 84—635 21 Claims





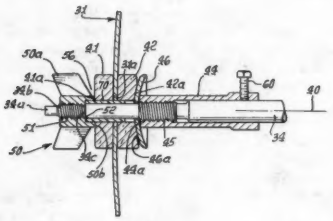
1. A rhythm recognizing apparatus comprising:
electrical signal generating means for generating an electrical signal in response to music from a source of music,
rhythm extracting means comprising filter means for filtering a rhythm signal from said electrical signal, said rhythm signal having a frequency band corresponding to the frequency of the sound of a rhythm producing instrument, and a signal peak detecting means for detecting signal peaks in said rhythm signal and for extracting said signal peaks from said rhythm signal,
interval data calculating means for calculating interval data based on intervals between said signal peaks,
storage means including a plurality of storage areas for temporarily storing a plurality of said interval data according to frequency of occurrence of similar time values of said interval data, and
cycle detecting means for obtaining interval data having the most frequently occurring time values, detecting said interval data having said most frequently occurring time values as a rhythm cycle, and providing a rhythm synchronizing signal in synchronization with said rhythm cycle.

9. A toy responsive to rhythm comprising:
electrical signal generating means for generating an electrical signal in response to music from a music source,
rhythm extracting means comprising filter means for filtering a rhythm signal from said electrical signal, said rhythm signal having a frequency band corresponding to the frequency of the sound of a rhythm producing instrument, and a signal peak detecting means for detecting signal peaks in said rhythm signal and for extracting said signal peaks from said rhythm signal,
interval data calculating means for calculating interval data based on intervals between said signal peaks,
storage means for storing said interval data,
cycle detecting means for detecting a rhythm cycle based on a time interval between said interval data stored in said storage means, said cycle detecting means providing a first rhythm synchronizing signal in synchronization with said rhythm cycle,
pattern signal generating means for providing a second rhythm synchronizing signal in synchronization with said first rhythm synchronizing signal,
a mechanical portion comprising a base, a first movable portion in association with said base and a second movable portion in association with said base,
first drive means for moving said first movable portion when said first movable portion is electrically energized,
second drive means for moving said second movable portion when said second movable portion is electrically energized, and
output control means for energizing said first and second drive means in response to said first rhythm synchronizing signal and said second rhythm synchronizing signal.

4,889,028
ADJUSTABLE CYMBAL HOLDER

Donald G. Lombardi, 2118 E. Hillcrest Dr., Thousand Oaks, Calif. 91360

Filed Mar. 20, 1989, Ser. No. 325,941
Int. Cl.[4] G10D 13/02
U.S. Cl. 84—421 4 Claims



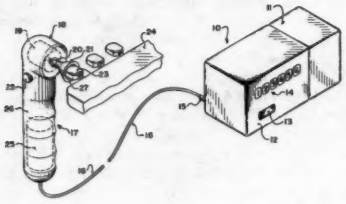
1. In a support for a cymbal, the combination comprising
(a) a first endwise elongated member defining an axis,
(b) two annular felt pads received on said member to be removable therefrom, axially,
(c) stop means on the member to seat one of the pads, axially, said stop means being axially adjustable,
(d) and retainer means on the member to compressively urge said pads toward the stop means, the retainer means located closer to an end of said member than said stop means,
(e) whereby a cymbal assembled between said pads receives predetermined compressive loading, axially, by the pads,
(f) said retainer means including a wing nut, there being a shoulder on the member to block travel of the nut towards the pads when the pads are compressed a predetermined extent between the stop means and the retainer means,
(g) said stop means including a sleeve threadably mounted on the said member to advance toward the pads as the sleeve is adjustably rotated, and an annular flange received on the member between the pads and said sleeve, the flange being loosely fitted on the said member, the flange having a convex surface facing and engaging one of the pads, the flange convex surface urged against the one pad by axial adjustment of the sleeve on said member,
(h) and including a set screw locking said sleeve to said member at an adjusted position of the sleeve on the member.

4,889,029

TUNING APPARATUS FOR STRINGED INSTRUMENTS

Carroll R. St. Denis, Winnipeg, Canada, assignor to Global Designs Inc., Winnipeg, Canada

Continuation-in-part of Ser. No. 157,623, Feb. 19, 1988, abandoned. This application Sep. 2, 1988, Ser. No. 239,661
Claims priority, application United Kingdom, Feb. 19, 1987, 8703865; Canada, Feb. 19, 1988, 559413
Int. Cl.[4] G10G *7/02*
U.S. Cl. 84—454 15 Claims



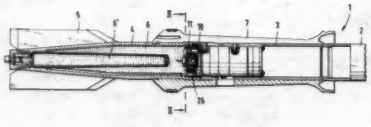
1. A device for use in tuning a stringed instrument having a plurality of tuning pegs each of which can be rotated to alter the tension of a string associated therewith to vary the frequency of the note produced by the string when plucked, the device comprising a manually graspable body, a head member extending outwardly from the body and shaped to releasably engage one of the tuning pegs of the instrument, the body being separate from the instrument and movable such that the head member can be engaged with each of the pegs independently as required, a motor mounted in the body and arranged to drivingly rotate the head member to rotate said one peg, said motor being arranged to be rotated in both a clockwise and counterclockwise direction to tension and loosen the string as required, sensor means arranged to detect the note produced by the string when plucked and to calculate the fundamental frequency of the note, means storing a plurality of predetermined required frequencies, each associated with a respective one of the strings of the instrument, comparator means arranged to compare the fundamental frequency of the note of the string with said plurality of predetermined required frequencies and to select from said predetermined required frequencies that one of the frequencies which is closest to said fundamental frequency and means for driving rotation of the motor in a direction to alter the fundamental frequency of the note of the string to said one of the frequencies.

4,889,030

PROJECTILE EQUIPPED WITH DEPLOYABLE PARACHUTE

Werner Grosswendt, Ratingen, and Klaus Unterstein, Duesseldorf, both of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

PCT No. PCT/EP87/00674, § 371 Date Sep. 22, 1988, § 102(e) Date Sep. 22, 1988, PCT Pub. No. WO88/05523, PCT Pub. Date Jul. 28, 1988
PCT Filed Nov. 5, 1987, Ser. No. 254,680
Claims priority, application Fed. Rep. of Germany, Jan. 22, 1987, 3701709
Int. Cl.[4] F42B *13/38*
U.S. Cl. 89—1.14 18 Claims



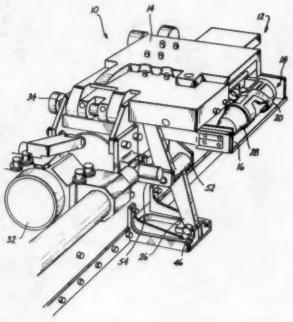
1. In a projectile including at least two sections arranged axially in tandem, a plurality of radial bolts disposed in respective radially extending bores connecting said two sections together, means, disposed in said projectile and including a pyrotechnic charge and a fuse for causing ignition of said charge, for producing a gas pressure for radially displacing said bolts to release the connection between and separate said two sections of said projectile, and at least one deployable parachute accommodated in one of said two sections; the improvement wherein said means for generating a gas pressure for radially displacing said bolts include gas conducting channels leading from said pyrotechnic charge to said radial bores to directly apply said gas pressure to a respective frontal face of each of said plurality of bolts which is to be charged with gas pressure.

4,889,031

FIREARM LOADING MECHANISM FOR AN AUTOMATED CANNON

John H. Peck, Fountain Valley, Calif., assignor to McDonnell Douglas Helicopter Company, Mesa, Ariz.

Filed Dec. 11, 1987, Ser. No. 131,562
Int. Cl.[4] F41D *10/08*
U.S. Cl. 89—33.2 21 Claims



1. An improvement in a feed mechanism for feeding ammunition to an automated gun comprising:

feed means for automatically feeding ammunition to said gun for firing;

an openable feed cover including driven means for automatically providing ammunition to said gun in cooperation with said feed means, said feed cover being openable to allow access to ammunition being supplied to said gun for firing, said feed cover being disposed in a portion of said gun separable at least in part from said feed means; and

means for maintaining operable drive linkage between said driven means and said feed means within said gun as said feed cover is configured between an opened and closed configuration,

whereby access of said ammunition into said gun is facilitated without disruption of ammunition feed to said gun.

4,889,032

AUTOMATIC FIREARM

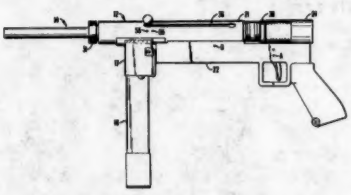
William J. Major, Walnut Creek, Calif., assignor to Barbara Major, Walnut Creek, Calif.

Continuation of Ser. No. 876,331, Jun. 19, 1986, abandoned. This application Nov. 1, 1988, Ser. No. 265,603
Int. Cl.[4] F41C *5/06, 11/00;* F41D *11/12*
U.S. Cl. 89—129.01 6 Claims

1. In a bolt action automatic firearm including a receiver mechanism defining a longitudinally extending cavity, a bolt assembly disposed within said cavity for reciprocation along the longitudinal direction thereof, and reciprocation means for

maintaining the reciprocation of said bolt assembly in said cavity for firing ammunition disposed at the front end of said cavity at a cyclic firing rate, the improvement wherein:

said reciprocation means comprises a single compression spring disposed behind said bolt assembly in said cavity for advancing said bolt assembly forward; and



said firearm further comprising means for selectively adjusting the longitudinal dimension of said cavity, so as to adjust the amount said spring is compressed under the reciprocating action of said bolt assembly, thereby adjusting the cyclic firing rate of said automatic firearm over an operationally significant range.

4,889,033

PNEUMATIC ACTUATOR

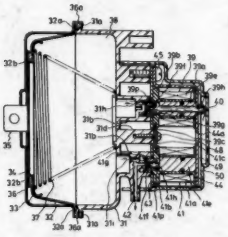
Masayoshi Onishi, and Tadayuki Fujimoto, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 216,051

Claims priority, application Japan, Jul. 8, 1987, 62-105454; Jul. 8, 1987, 62-105455; Jul. 8, 1987, 62-105456; Jul. 8, 1987, 62-105457; Jul. 17, 1987, 62-110502; Jul. 17, 1987, 62-110505

Int. Cl.[4] F01B *25/02*

U.S. Cl. 91—6 **8 Claims**



1. A pneumatic actuator comprising:

a housing;

a case which forms an enclosed space therein together with said housing;

a diaphragm which is held in said space to form a diaphragm compartment and expands/contracts by change of an internal air pressure thereof thereby to output a displacement out of said case;

a spring which is held in said diaphragm compartment for expanding said diaphragm;

a pair of intake solenoid valves which connect/disconnect said diaphragm compartment with/from atmosphere and each of which comprises a fixed iron core through which a passage is formed for intaking air in an axial direction thereof, a movable iron core for opening/closing a valve and a spring which pushes said movable iron core by an end thereof to open said valve;

an exhaust solenoid valve which connects/disconnects said diaphragm compartment with/from negative pressure suction source;

a yoke which holds said intake solenoid valves and said exhaust solenoid valve and is fixed on said housing; and

a cover which covers said intake solenoid valves and said exhaust solenoid valve and receives said other end of said spring of said intake solenoid valve; wherein

said intake solenoid valves and said exhaust solenoid valve are disposed in a triangular disposition with terminal side thereof faced to said housing, and one of terminals of said each solenoid valve is secured with each other at a center part of said triangular disposition, and said other terminal of each solenoid valve is disposed outward of said triangular disposition, and wherein

said spring of each intake solenoid valve passes through said passage.

4,889,034

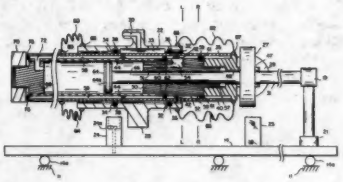
AUTOMATIC RECIPROCATOR WITH MANIFOLD AND SLEEVE VALVE

Royce H. Husted, 711 Lakeside Dr., Wheaton, Ill. 60187

Filed Jun. 29, 1988, Ser. No. 212,894

Int. Cl.[4] F01L *15/00*

U.S. Cl. 91—218 **11 Claims**



1. A pneumatic reciprocator comprising:

an air cylinder including a movable piston assembly and air passageways;

manifold means substantially surrounding said air cylinder and isolating said air passageways; and

sleeve valve means movably mounted on said manifold means for supplying compressed air to said air passageways in accordance with the position of said sleeve valve means on said manifold means.

4,889,035

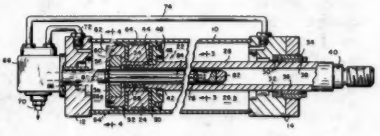
MAGNETICALLY ACTUATED VALVE FOR CYCLICALLY OPERATING PISTON-CYLINDER ACTUATOR

Ronald F. Goodnow, Leicester, Mass., assignor to Thermo Electron Web Systems, Inc.

Filed Jul. 16, 1985, Ser. No. 755,618

Int. Cl.[4] F01L *25/08*

U.S. Cl. 91—275 **5 Claims**



1. A magnetically actuated fluid pressure oscillator comprising:

a cylinder;

a piston assembly including a piston contained within and sub-dividing the interior of said cylinder into first and

second chambers, with a piston rod and protruding from said piston through one end of said cylinder;

a control valve mounted externally of said cylinder and adapted for connection to fluid and return lines, said control valve being connected by conduit means to said first and second cylinder chambers and having an actuating rod shiftable in opposite directions relative to both said cylinder and said piston assembly to adjust said valve between an advance setting at which said fluid pressure and return lines are connected respectively to said first and second chambers, and a retract setting at which said fluid pressure and return lines are connected respectively to said second and first chambers, thereby controlling the flow of pressure fluid to and from said chambers in a manner causing said piston assembly to reciprocate relative to said cylinder;

mutually spaced magnetic elements carried by said actuating rod; and

a magnet carried by said piston assembly for reciprocating movement therewith, said valve being alternately adjustable from one to the other of said advance and retract settings by the magnetic force of said magnet acting on said magnetic elements to shift said actuating rod in opposite directions.

4,889,036

SPEED REDUCER FOR PNEUMATIC ACTUATOR

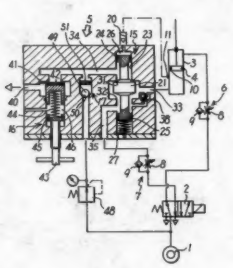
Akihisa Yoshikawa; Masamichi Tajima; Watanabe Kunio, and Toshiharu Sato, all of Soka, Japan, assignors to SMC Corporation, Tokyo, Japan

Filed May 27, 1988, Ser. No. 199,958

Claims priority, application Japan, May 30, 1987, 62-137105

Int. Cl.[4] F15B *15/22*

U.S. Cl. 91—403 **7 Claims**



1. A speed reducer for pneumatic actuators which comprises a pneumatic actuator connected to a source of compressed air through a changeover valve and a speed-reducing valve assembly connected to an air passage through which compressed air is discharged when the pneumatic actuator is decelerated:

the speed-reducing valve assembly comprising:

a three-way valve actuated by a decelerating signal issued when the actuator has reached the point where deceleration is to be started;

a relief valve that lets out the compressed air in the passage at a preset relief pressure level; and

a check valve that allows only the admission of compressed air into a passage leading to said relief valve;

the signal-actuated three-way valve switches the air passage in the actuator from a passage leading to the atmosphere through the changeover valve to the passage in which the relief valve and check valve are provided;

the check valve being connected to a pressure-reducing valve through which the fluid from the source of compressed air is supplied after lowering the fluid pressure to the desired level.

4,889,037

CHAMBER EQUIPPED WITH A BREATHER OPENING TO THE ATMOSPHERE

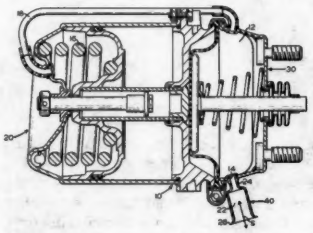
Erhard Goral, Peine, and Walter Mensing, Pattensen, both of Fed. Rep. of Germany, assignors to Wabco Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany

Filed Dec. 5, 1988, Ser. No. 280,100

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1987, 3742343

Int. Cl.[4] F15B *21/04*

U.S. Cl. 92—78 **4 Claims**



1. An apparatus to substantially minimize an entrance of contaminated air into an ambient pressure chamber having a breather opening formed through a wall portion of a brake cylinder for fluid communication with outside atmosphere, said apparatus comprising: an open breather chamber engageable with said wall portion of said ambient pressure chamber of said brake cylinder, said open breather chamber having an entry cross-sectional area of between about 4 times and about 25 times a cross-sectional area of said breather opening, a length of said breather chamber in relationship to a diameter (D) of said entry cross-sectional area, or a representative circular area, stands in a ratio of at least about 0.6.

4,889,038

HYDRAULIC CYLINDER

Giovanni Bentivoglio, Woodbridge, Canada, assignor to Tovel Manufacturing Limited, Concord, Canada

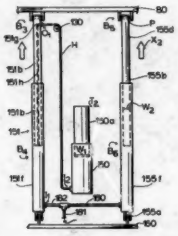
Filed Jul. 18, 1988, Ser. No. 220,805

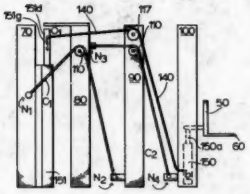
Int. Cl.[4] F01B *31/00*; B66B *9/20*

U.S. Cl. 92—110 **14 Claims**

1. A hydraulic cylinder comprising a hollow tubular sleeve having inserted there within in use a hollow piston rod, said hollow sleeve having disposed therein at one end thereof an inlet for hydraulic fluid and being otherwise substantially closed at that end, said hollow cylinder having inserted therein the hollow piston rod in use, said hollow piston rod in use having disposed at the end of the piston rod proximate the closed end of the cylinder an opening allowing hydraulic fluid to pass from the inlet into the hollow piston rod, the hollow piston rod being otherwise substantially open at the end of the opening across at least a portion of the diameter of the piston rod at the end of the opening, said hollow piston rod having disposed at the end of the hollow piston rod remote the opening therein mounting means, the hollow piston rod having at the end proximate the mounting means an outlet, wherein the hollow piston rod further comprises mounting means being lug means, whereby in use hydraulic fluid passes through the inlet

of the hollow sleeve into the piston rod at the end proximate the inlet to the hollow sleeve and then out of the piston rod





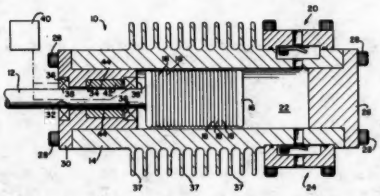
proximate the lug means of the piston rod at the end of the piston rod remote the hydraulic oil inlet.

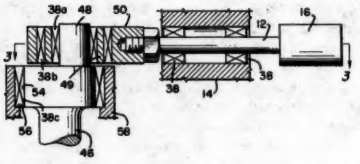
4,889,039

GAS COMPRESSOR WITH LABYRINTH SEALING AND ACTIVE MAGNETIC BEARINGS

Bernard F. Miller, 154 Pritchard Ave., Corning, N.Y. 14830

Filed Oct. 17, 1988, Ser. No. 258,643
Int. Cl.[4] F01B *9/02*; F16J *15/16*
U.S. Cl. 92—140 **8 Claims**





1. A gas compressor, of the reciprocating-piston type, comprising:

a cylinder having an inner, bore surface; and

a piston, reciprocally disposed in said cylinder; wherein

said piston has an outer, cylindrical surface;

one of said surfaces has means, cooperative with the other of said surfaces, for creating a gas sealing, annular, air dam between said surfaces;

said piston has a rod extending therefrom;

said cylinder has a closure or wall at an end thereof, with an aperture formed therein and centrally thereof;

said rod is in penetration of said aperture; and further including

means interpositioned between said rod and said aperture for suspending said rod noncontactingly in said aperture;

a rotary drive shaft having an offset crank pin;

a yoke circumjacent said pin;

means coupling said yoke to said rod;

an active magnetic bearing interpositioned between said yoke and said pin;

a floating member (a) confined within said yoke, and (b) circumjacent said pin, being interpositioned between said pin and said yoke;

a second active magnetic bearing interpositioned between said member and said yoke; wherein

said pin causes said member to translate, within said yoke, transverse to said rod; and

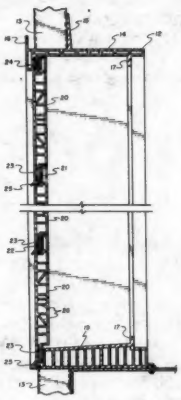
said bearings noncontactingly suspend (a) said pin in said member, and (b) said member in said yoke.

4,889,040

INSULATED AND NON-METALLIC TRANSPARENT AND FULLY SEALED LOUVER SYSTEM

Henry H. Man, Salt Lake City, Utah, assignor to Continental Engineering Co., Inc., Salt Lake City, Utah

Filed Nov. 30, 1988, Ser. No. 277,888
Int. Cl.[4] E05B *65/04*
U.S. Cl. 98—121.2 **6 Claims**



1. A louver system for industrial and residential use comprising, in combination:

a frame means for housing multiple louver blades in parallel conformation to each other, said frame being made of material having transparent qualities;

said multiple louver blades each being formed as a single unit comprising a front face and back face, substantially hollowed therebetween with structural ribs spanning the hollowed space, said louver blades being made of material having transparent airtight and insulation qualities; and

an operating mechanism means for opening and closing said louver blades which is made of material having transparent qualities.

4,889,041

ELECTRIC APPLIANCE FOR MAKING HOT BEVERAGES

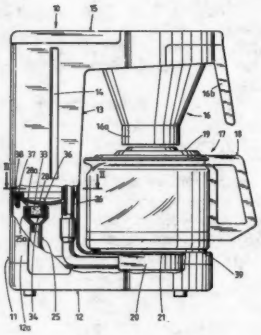
Gotthard C. Mahlich, Kronberg, and Michael Borgmann, Solingen, both of Fed. Rep. of Germany, assignors to Robert Krups Stiftung & Co. KG, Solingen, Fed. Rep. of Germany

Filed Aug. 31, 1988, Ser. No. 239,192

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1987, 3729773

Int. Cl.[4] A47J *31/00*

U.S. Cl. 99—285 **22 Claims**



1. An electric machine for making hot beverages, such as coffee and tea, comprising a vessel arranged to store a body of water, such as magnesium- and/or calcium-containing tap water, said vessel having a water outlet; a receptacle arranged to contain a flavoring agent; means for conveying water from said outlet to said receptacle so that the thus conveyed water contacts the flavoring agent; at least one water processing device arranged to receive water from said outlet; and means for softening water in the region of said outlet so that said at least one water processing device receives only softened water.

4,889,042

ELECTRIC HOUSEHOLD APPLIANCE COMBINING A TOASTER AND AN OVEN

Dominique Hantz; Dominique Antoine, both of Vagney, and Bruno Jackowski, Fontaine-les-Dijon, all of France, assignors to SEB S.A., Selongey, France

PCT No. PCT/FR87/00513, § 371 Date Aug. 2, 1988, § 102(e) Date Aug. 2, 1988, PCT Pub. No. WO88/04908, PCT Pub. Date Jul. 14, 1988

PCT Filed Dec. 23, 1987, Ser. No. 246,660

Claims priority, application France, Dec. 26, 1986, 86 18201

Int. Cl.[4] A47J *37/08*

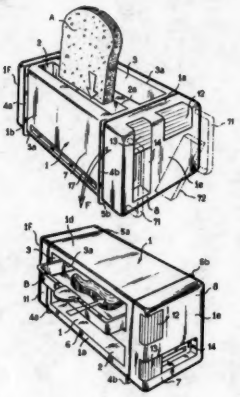
U.S. Cl. 99—340 **10 Claims**

1. Domestic electric appliance which combines toasting of bread and cooking or heating of dishes, comprising:

separate elongated compartments extending parallel in a fixed relationship to one another, respectively for toasting and cooking;

in each said compartment, specific heating means respectively for toasting and cooking; and

bearing means allowing tilting said compartments into two positions located substantially at right angles to each other



and corresponding to their normal respective positions of operation.

4,889,043

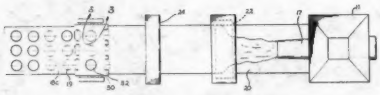
APPARATUS FOR THE MANUFACTURE OF PERFORATED PITA BREAD AND METHOD OF MANUFACTURING THE SAME

Daniel Mani, Los Angeles, Calif., assignor to International Baking Co., Inc., Vernon, Calif.

Division of Ser. No. 51,503, May 18, 1987, Pat. No. 4,800,807. This application Oct. 27, 1988, Ser. No. 263,598

Int. Cl.[4] A23P *1/00*

U.S. Cl. 99—450.2 **8 Claims**



1. In a pocket bread manufacturing apparatus of the type having a conveyor system and providing a flat sheet of dough on said conveyor system having a predetermined thickness, the improvement comprising a pita cutter comprising a cylindrical wheel rotatably mounted above said conveyor system with the circumferential surface thereof passing near said conveyor system, said wheel having disposed on a circumferential surface thereof a plurality of circular, pita-cutting blades which come in contact with said conveyor system when disposed adjacent thereto for cutting round pita dough from said flat sheets of dough, and at least one circular, saw-toothed, perforating blade disposed adjacent and perpendicular to said conveyor system, said blade having disposed thereon a plurality of teeth of sufficient depth to provide in a pita loaf formed thereby perforations at a predetermined position, whereby a pita loaf is formed which during baking does not rupture as a result of the gases escaping from said perforations during baking.

4,889,044

FRUIT JUICE EXTRACTOR/STRAW

Ronald H. Rosenfield, Del Mar, Calif., assignor to Alltech Services, Incorporated, San Diego, Calif.

Continuation of Ser. No. 21,996, Mar. 5, 1987, abandoned. This application Feb. 24, 1989, Ser. No. 317,117

Int. Cl.[4] A47G *21/18*

U.S. Cl. 99—510 1 Claim

1. A juice extractor/straw for spherically shaped citrus fruit of various dimensions including a tubular elongated stem of external rectangular cross-section having an open upper end and open lower end and an axial passageway extending from the lower end to the upper end thereof, said upper end of stem being provided with a handle as well as being stopped by a flange having a concave inner surface coacting with the spherical surface of the fruit to provide a tight sealing engagement with the surface of the fruit, said flange also containing an oversized hole which permits said stem to act as a variable length member by passing through said hole, thereby sinking to different depths within the fruit, ultimately reaching to the other end of said fruitn regardless of size, said flange permits said stem to act as an angling member relative to the flange by sweeping through different latitudes of pulp within the fruit when the juice extractor/straw is held rigid and the fruit is rotated, said stem below said flange comprised of a multiplicity of angularly disposed sections which permit said stem to sweep through the pulp close to the center of the fruit as well as through pulp residing near the rind when said variable length and angling capabilities relative to the flange are exercised in combination to one another, each succeeding section being shorter in length than the previous section and being angularly disposed to the previous section having a first downwardly axial displacement of approximately 53 degrees from the vertical, a second downwardly axial displacement of approximately 60 degrees from the vertical, a third downwardly axial displacement of approximately 55 degrees from the vertical and a fourth downwardly axial displacement of approximately 35 degrees from the vertical, such that lower portion of said stem occupies less volume within the fruit, serving to displace less pulp and to reduce internal fruit pressure buildup and leakage, and lower portion of said stem having radial holes communicating with said axial passageway of such size as to permit the free flow of the juices into said stem without allowing the entrance of seeds or pulp in order to withdraw the juice from the fruit when the user sips on the juice extractor/straw and squeezes fruit.

4,889,045

APPARATUS FOR PELLING BULBOUS PLANTS

Petrus A. M. Backus, Venlo, Netherlands, assignor to Backus Sormac B.V., Netherlands

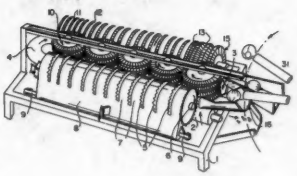
Filed Jan. 15, 1988, Ser. No. 144,271

Claims priority, application Netherlands, Jan. 15, 1987, 8700088

Int. Cl.[4] A23N *7/00, 15/08*

U.S. Cl. 99—546 13 Claims

1. Apparatus for removing outer skin covering of bulbous produce such as onions, which comprises the combination of means for removing head and tail portions of the produce to provide a residual body of generally spherical form having opposite ends which are severed to expose usable portions of the produce devoid of skin covering, conveyer means receiving the residual body for traveling it along a path and including friction means for rotating the residual body about axes which are generally orthogonally related, and cutter means disposed



adjacent to and laterally of said conveyor means for penetating only the outer skin covering of the residual body as such body moves along the path whereby the friction means peels off the severed outer skin covering as the residual body progresses along the path.

4,889,046

DEVICE FOR PEELING ONIONS OR OTHER BULBOUS OR TUBEROUS PLANTS

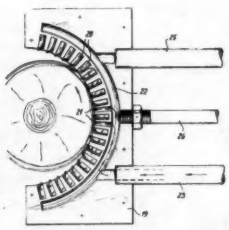
Andreas H. W. M. Cornelissen, Oosterhout, Netherlands, assignor to Instituut Voor Bewaring en Verwerking Van Landbouwprodukten, Wageningen, Netherlands

Filed Jan. 26, 1989, Ser. No. 302,405

Claims priority, appli[illegible]therlands, Feb. 2, 1988, 8800250

In[illegible] A23[illegible] *7/00, 15/08*

U.S. Cl. 99—546 6 Claims



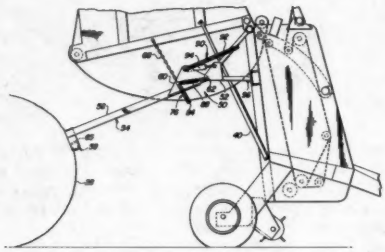
1. Device for peeling onions or other bulbous or tuberous plants, comprising a knife holder with one or more knives for making a circumferential cut in the onions and at least one nozzle for feeding in compressed air or another pressurized medium for removing the peelings, said nozzle (**21**) for the supply of compressed air being fitted in the knife-holder (**19**) a short distance away from a knife (**20**); guide means for taking the line through head and tail of the onions in a specific direction; two rotary parallel clamping plates (**8***a*, **8***b*) for clamping an onion, means (**16***a*, **16***b*) for moving the clamping plates towards and away from each other, transfer means (**7**) for transferring an onion from the guide means (**1**, **2**, **3**) to a position between the clamping plates (**8***a*, **8***b*), and means for moving the knife-holder (**19**) in the direction of a position situated centrally between the plates.

4,889,047

BALE PUSH BAR

William A. Ardueser, and Henry D. Anstey, both of Ottumwa, Iowa, assignors to Deere & Company, Moline, Ill.

Division of Ser. No. 75,499, Jul. 20, 1987, Pat. No. 4,779,527.
This application Jul. 18, 1988, Ser. No. 222,982
Int. Cl.[4] B30B *5/04, 9/00*
U.S. Cl. 100—87 1 Claim



1. In a baler for forming large cylindrical bales including a front section, a bale discharge gate defining a rear section and being vertically pivotally mounted to the front section for movement between a lowered closed position and a raised open position, an extensible and retractable actuator connected between the front and rear section for selectively opening and closing said gate, and a U-shaped bale push bar having opposite legs joined by a push member and being vertically pivotally mounted to opposite sides of the front section for movement about a horizontal axis between a retracted position disposing the push member beneath the gate when the latter is completely closed and an extended position disposing the push member rearwardly beyond the gate when the gate is in its open position and a further actuator for causing the movement of the push bar from its retracted to its extended position to follow movement of the gate to its open position and for causing movement of the push bar from its extended to its retracted position to follow movement of the gate to its closed position, the improvement comprising: said push member being located along a second axis paralleling said horizontal axis and including a cylindrical metal core having a plastic tube rotatably mounted thereon for rotation about said second axis for reducing frictional drag of said push bar with a bale.

4,889,048

HIGH HEAT FLUX ROLL AND PRESS UTILIZING SAME

Ray R. Miller, 8816 Warren Dr. NW., Gig Harbor, Wash. 98335

Filed Apr. 13, 1988, Ser. No. 181,100
Int. Cl.[4] B30B *15/34*
U.S. Cl. 100—93 RP 24 Claims

1. A drum and belt press of the type comprising a rotatable drum, a belt in tension partially wrapped around the drum, and at least one nip roll acting against the drum through the belt;

the drum further comprising a rotatable outer shell means and a stationary core means axially located within the shell means,

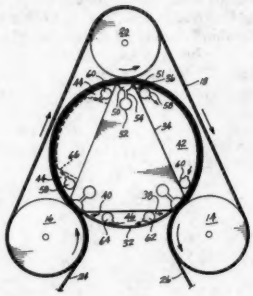
said core means having a plurality of first shell support means having close radial clearance with the inner surface of the shell means at each nip roll position,

the space between adjacent first support means comprising a pressurizable chamber for supporting the shell between the first support means;

fluid supply lines for conducting a pressurized fluid to each chamber;

fluid discharge lines, spaced apart in the chambers from the supply lines, for conducting the fluid from each chamber for return to a supply source,

whereby the first shell support means support the shell against the relatively high forces exerted by the nip roll or rolls, and the pressurizable chambers hydraulically support the shell against the relatively much lower distributed forces exerted by the belt in the zones between the nip roll or rolls.

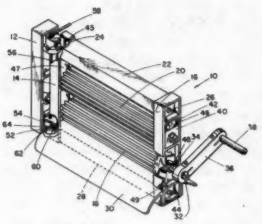


4,889,049

WRINGER DEVICE

Stephen R. Foster, 918 Nashville Ave., New Orleans, La. 70115, and Thomas R. Oschmann, 4951 Bundy Rd., New Orleans, La. 70127

Filed Aug. 29, 1988, Ser. No. 237,721
Int. Cl.[4] B30B *3/04*
U.S. Cl. 100—171 12 Claims



1. A wringer unit for squeezing liquid from an absorbant sheet-like material when sandwiched between first and second roller members having substantially parallel axes and each having a uniform nominal diameter, the wringer unit comprising:

a first plastic-material support member having a planar face surface for rigidly mounting the first support member to a surface;

a second plastic-material support member connected to the first member and having a first cylindrical-shaped interior receiving member extending through the second support member for rotatably receiving an end of the first roller, and having a second receiving member extending through the second support member for supporting an end of the second roller;

a third plasticmaterial support member fixedly interconnected with the second support member and having a third cylindrical-shaped interior receiving member extending through the third support member for rotatably receiving another end of the first roller, and having a fourth receiving member through the third support member for supporting another end of the second roller;

a first block mounted within the second receiving member for rotatably receiving the end of the second roller, such that the first end of the second roller can move radially

within the second receiving member with respect to the axis of the first roller;

a second block mounted within the fourth receiving member for rotatably receiving the another end of the second roller, such that the another end of the second roller can move radially within the fourth receiving member with respect to the axis of the first roller;

first and second biasing members for biasing the ends of the second roller toward the axis of the first roller; and

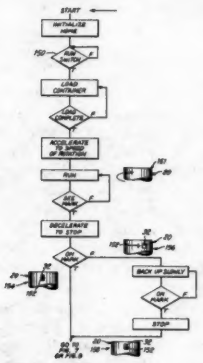
a crank arm fixedly connected to the first or second roller for rotating the first or second roller, each of the first and second roller members each having a plurality of exterior curvilinear hill surfaces each radially outward from a nominal diameter of each roller member and a plurality of exterior curvilinear valley surfaces each radially inward from the nominal diameter of each roller member, such that the hill surfaces of the first roller member mesh with the valley surfaces of the second roller ember, and the valley surfaces of the first roller mesh with the hill surfaces of the second roller member.

4,889,050

APPARATUS AND METHOD FOR DECORATING TUBULAR CONTAINERS AND LIKE ITEMS

Neil A. Meador, Montvale, N.J., assignor to Permanent Label Corporation, Clifton, N.J.

Filed Sep. 29, 1988, Ser. No. 251,197
Int. Cl.[4] B41F 17/22
U.S. Cl. 101—38.1 **16 Claims**



1. In apparatus for decorating a surface of a tubular container, or a similar item, with a decorating medium by registering the surface of the container appropriately relative to a corresponding surface of a decorating means and effecting relative movement of the container along the decorating means to transfer the decorating medium from the surface of the decorating means to the surface of the container, while maintaining at zero the relative velocity between the surface of the container and the surface of the decorating means at an area of transfer of the decorating medium from the surface of the decorating means to the surface of the container, the container having a registration mark thereon, the improvement comprising:

a holder for holding the container;

a motor coupled to the holder for rotating the holder and the container held on the holder in response to operation of the motor;

detector means juxtaposed with the holder in position to detect the location of the registration mark when the registration mark is placed at a predetermined position relative to the decorating means;

a controller coupled with the motor for controlling the operation of the motor and coupled with the detector means such that the motor initially is operated in a first mode for effecting registration of the mark at the predetermined position and subsequently is operated in a second mode of operation for effecting transfer of the decorating medium from the decorating means to the container, the first mode of operation being independent of the second mode of operation; and

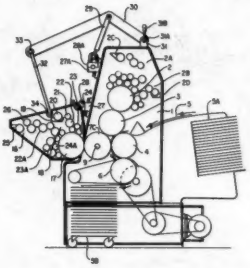
translating means for effecting relative movement between the holder and the decorating means to bring the surface of the container into contact with the surface of the decorating means at the area of transfer of the decorating medium when the surface of the container is registered appropriately relative to the corresponding surface of the decorating means, and for subsequently effecting relative translation between the holder and the decorating means while the motor is operated in the second mode of operation to transfer decorating medium from the decorating means to the container, the rate of rotation of the holder being related to the rate of translation such that the relative velocity between the surface of the container and the corresponding surface of the decorating means is maintained at zero at the area of transfer of the decorating medium.

4,889,051

REMOVABLE INKING DEVICE FOR OFFSET PRESS

Jean-Claude Sarda, 48 Avenue Claude Vellefaux, Paris, France 75010

Filed Jul. 25, 1988, Ser. No. 224,071
Claims priority, application France, Aug. 3, 1987, 87 10972
Int. Cl.[4] B41F 7/06, 7/10, 13/40
U.S. Cl. 101—77 **6 Claims**



1. In a printing press having:

a plate cylinder;

a means for linking said plate cylinder in a first color with a first ink;

a blanket cylinder in circumferential contact with said plate cylinder for receiving images from said plate cylinder in said first ink;

a pressure cylinder in adjustable circumferential contact with said blanket cylinder;

a feed means for drawing paper between said pressure cylinder and said blanket cylinder to deposit said images in said first ink on said paper;

a drive means for rotating said plate cylinder, blanket cylinder, and said pressure cylinder;

a detachable dual mode numbering and coloring device including a inking unit in circumferential contact with a removable numbering cylinder, said removable numbering cylinder being in circumferential contact with said pressure cylinder and rotated by said drive means, for printing page numbers on said paper drawn between said removable numbering cylinder and said pressure cylinder when in a numbering mode, and with said inking unit in

circumferential contact with a removable coloring cylinder, said removable coloring cylinder being in circumferential contact with said pressure cylinder and rotated by said drive means, for printing images in a second ink of a second color on said paper drawn between said removable coloring cylinder and said pressure cylinder when in a coloring mode;

the improvement comprising:

a removable auxiliary blanket cylinder adapted for attachment in the press in the location provided for the removable numbering and coloring cylinders, and for rotation by said drive means; and

a movable inking module coupled to said printing press, including an inking unit, a damping unit, and an auxiliary plate cylinder, operable in a first mode with said auxiliary plate cylinder in circumferential contact with said auxiliary blanket cylinder for depositing images in a third ink of a third color on said paper, and operable in a second mode with said auxiliary plate cylinder in circumferential contact with said blanket cylinder for depositing images in a third ink of a third color on said paper while allowing simultaneous operation of said detachable dual mode numbering and color device.

4,889,052

PAPER FEED CONTROL FOR A DOT-LINE PRINTER

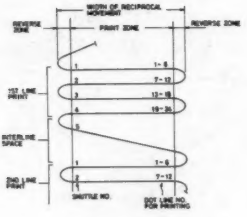
Yoshikane Matsumoto; Toshio Hiki, and Makoto Kurosawa, all of Ibaraki, Japan, assignors to Hitachi Koki Company, Limited, Tokyo, Japan

Filed Nov. 23, 1987, Ser. No. 124,121

Claims priority, application Japan, Nov. 21, 1986, 61-278976

Int. Cl.[4] B41J *3/12*

U.S. Cl. 101—93.04 **3 Claims**



1. In a dot-line printer comprising a hammer bank carrying a plurality of dot-printing hammers separated from each other at predetermined intervals along a printing line, and a shuttle mechanism for causing said hammer bank to reciprocate with forward and backward shuttle movements along said printing line, wherein printing occurs as the hammer reciprocates, first means for feeding the paper over predetermined dot-means in the shuttle direction reversing period between successive shuttle movements and second means for feeding the paper after completion of a printed line to the first dot-line of the next line to be printed, there being a plurality of shuttle movements for printing each printing line, wherein the improvement comprises:

at least one group of printing hammers containing a predetermined number of printing hammers displaced from one another by predetermined numbers of dot-lines in a direction of paper feed, means for activating said predetermined number of printing hammers constituting said group to thereby simultaneously print a number of dots equal to said predetermined number of hammers, control means for controlling said first and second feed means and said shuttle mechanism such that the reversing period between successive shuttle movements is longer than the time required for carrying out the paper feed after completion of a printed line to the first dot-line of the next line to be printed, and the paper feed from the last printed dot-line of a printed line to the first dot-line of the next line to be printed takes place entirely during a reversing period, wherein the reversing period between shuttle movements is constant without regard to whether the reversing period is during the printing of a printed line or during the paper feed between printed lines, where the number of lines in which said paper is fed is greater between printed lines than during the printing of a printed line.

4,889,053

PROJECTILE EQUIPPED WITH BRAKING PARACHUTE

Werner Grosswendt, Ratingen; Klaus Unterstein, Düsseldorf, and Walter Simon, Herzogenrath, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany

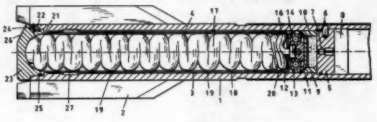
PCT No. PCT/EP88/00022, § 371 Date Oct. 17, 1988, § 102(e) Date Oct. 17, 1988, PCT Pub. No. WO88/06267, PCT Pub. Date Aug. 25, 1988

PCT Filed Jan. 14, 1988, Ser. No. 272,777

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1987, 3705078

Int. Cl.[4] F42B *4/12, 15/02*

U.S. Cl. 102—348 **8 Claims**



1. Projectile including a receiving chamber (4) delimited by an interior wall (3) for a braking parachute (17) which can be ejected by way of a piston (9) that is longitudinally displaceable in the projectile, with the piston (9) being chargeable by an ignitable pyrotechnic charge (10) and the braking parachute (17) being surrounded by a longitudinally divided sleeve (18) which at one end is in engagement with the piston (9), characterized in that the rear of the receiving chamber (4) is sealed by a cover (23) which can be ejected by way of the piston (9) and which is in engagement with the other end of the sleeve (18); the braking parachute (17) is fastened to the piston (9); the projectile or a part (1) thereof connected with projectile components which are to be recovered is provided, at the rear exit end of the receiving chamber (4), with a catch ring (21) for the piston (9), said catch ring allowing passage of the sleeve (18) and guides (19, 28) for the sleeve (18) are provided at the interior wall (3) of the receiving chamber (4).

4,889,054

STEERING ARMS FOR SELF-STEERING TRUCKS AND TRUCK RETROFITTING METHOD

Harold A. List, Bethlehem, Pa., assignor to Railway Engineering Associates, Inc., Bethlehem, Pa.

Continuation of Ser. No. 822,631, Jan. 27, 1986, which is a division of Ser. No. 623,189, Jun. 21, 1984, Pat. No. 4,655,143, which is a continuation-in-part of Ser. No. 948,878, Oct. 5, 1978, Pat. No. 4,455,946, which is a continuation-in-part of Ser. No. 608,596, Aug. 28, 1975, Pat. No. 4,131,069, which is a continuation-in-part of Ser. No. 438,334, Jan. 31, 1974, abandoned. This application Dec. 2, 1987, Ser. No. 127,558

The portion of the term of this patent subsequent to Nov. 17, 2004, has been disclaimed.

Int. Cl.[4] B61D *1/00*

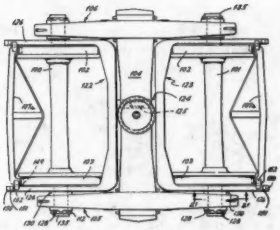
U.S. Cl. 105—167 **3 Claims**

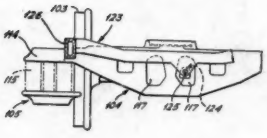
2. A method of retrofitting a railroad truck having load-carrying framing including side frame elements with two pairs of pedestal jaws, two wheelsets each fixed on an axle extended across the truck in a horizontal plane, the end portions of each

axle having a pair of bearings and bearing adapters received in the pairs of pedestal jaws, the bearing adapters of each pair having load-carrying connection with the side frame elements and having freedom for limited and uncoordinated movement in said horizontal plane with respect to the pair of adapters for the other wheelset, and the load-carrying connection of each bearing adapter further acting to constrain wheelset steering, the truck being retrofitted further having a bolster extended between the side frame elements, the bolster having a transverse aperture on an axis extended fore-and-aft of the truck, which method comprises:

(a) applying a steering arm to each wheelset,

(b) establishing connections between the adapters and the steering arms, said connections fixedly interpositioning each adapter horizontally with respect to the arm to which it is connected and thereby provide for conjoint motion of each pair of adapters and its wheelset with its steering arm in said horizontal plane,





(c) establishing a pivotal steering interconnection of one steering arm to the other thereof in the region of the truck between the wheelsets, said interconnection including a pivot joint shiftable laterally of the truck independently of lateral motions of the truck framing and providing transmission of steering forces from one wheelset to the other and for coordinated relative steering motions of the wheelsets in said horizontal plane independently of lateral motions of the load-carrying framing,

(d) introducing yielding pivotal steering motion restraining means in load-transmitting position between the bearing adapters and the base ends of the pedestal jaws for at least one of the wheelsets,

(e) and extending said pivotal steering arm interconnection through the bolster aperture independently of yaw-inducing connection with the bolster.

4,889,055

RAILROAD CAR FOR CONTAINER TRANSPORT

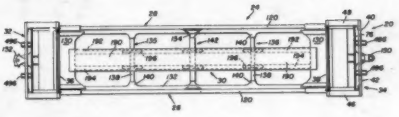
Richard E. Jamrozy, Lansing, Ill., and James M. Wilczynski, Highland, Ind., assignors to Thrall Car Manufacturing Company, Chicago Heights, Ill.

Continuation of Ser. No. 219,480, Jul. 15, 1988, which is a continuation of Ser. No. 74,341, Jul. 16, 1987, Pat. No. 4,807,722, said Ser. No. 219,480, is a continuation-in-part of Ser. No. 890,284, Jul. 29, 1986, Pat. No. 4,771,705. This application Apr. 17, 1989, Ser. No. 339,230

The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.

Int. Cl.[4] B61D *3/20*

U.S. Cl. 105—355 **3 Claims**



1. A railroad car for carrying containers comprising:

a car body supported by rail truck means adapted for movement over a railroad;

the car body having opposing side walls and an end wall near each end, spaced longitudinally inward of the truck means and connected to the side walls with said side walls and end walls defining a well in which two containers can be received and positioned to abut end-to-end;

means for supporting the bottoms of the two containers when in the well, comprising a metal reinforcement joined to each side wall where the adjacent ends of the two containers abut each other; and

each metal reinforcement having a substantially vertical leg joined to a side wall and the reinforcement having an arm extending laterally substantially horizontally inward toward the center of the car to support a container bottom.

4,889,056

COVER AND LATCHING MECHANISM FOR RAIL CAR LOADING HATCH

Thomas Stewart, Candler, N.C., assignor to Trinity Industries, Inc., Dallas, Tex.

Filed Mar. 27, 1985, Ser. No. 716,577

Int. Cl.[4] B61D *39/00*

U.S. Cl. 105—377 **10 Claims**

1. A cover for closure over a hatch opening in a railway car hopper means or the like, comprising;

a cover member adapted to be closed over means forming a hatch opening in said hopper means;

hinge means connected to said cover member for moving said cover member between an open position and a closed position in sealed engagement with said means forming said hatch opening;

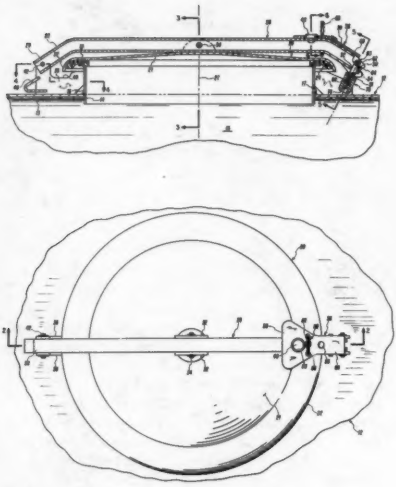
closure latch means for locking said cover member in said closed position and including a latch member operable to be moved in stages from a cover locking position to a first position permitting only partial opening movement of said cover and from said first position to a second position releasing said cover member for movement to a full open position;

link means operable when said latch member is in said first position and fluid pressure is being exerted against the inside of said cover member to provide an interlock preventing movement of said latch member to said second position until after the fluid pressure has been relieved;

said latch member is pivotally connected to said link means and said link means includes a first pivot member connected to means fixed to said hopper means, and said latch

member includes means cooperable with means connected to said cover member for limiting the movement of said cover member to said first position and for moving said cover to said closed position;

said latch member and said means connected to said cover member include cooperating slot means and pin means formed on said latch member and said means connected to said cover member for moving said cover member to a



closed and latched position and for retaining said cover member engaged with said latch member in said first position partially opened to relieve said fluid pressure; and

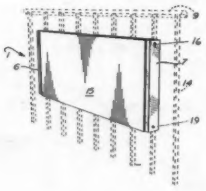
said latch member includes a surface engageable with said link means to limit pivotal movement of said latch member so as to maintain said pin means in said slot means until said cover member moves from said partially open first position toward said closed position in response to relief of fluid pressure in said hopper means.

4,889,057

BALCONY RAMP MOUNTED TABLE CONVERTIBLE INTO A SEAT

Clément Chartrand, 108 St. Hilaire Street, Longueuil, Canada J4J 2P2

Filed Apr. 1, 1988, Ser. No. 177,538
Int. Cl.[4] A47B *23/00*
U.S. Cl. 108—42 **1 Claim**



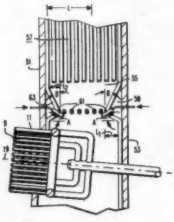
1. A table convertible into a seat and attachable to a balcony railing having a plurality of spaced-apart vertical bars, comprising a generally rectangular frame including an upper beam, a lower beam and a pair of parallel posts joining said beams and projecting forwardly of said beams, and each post having an upper and a lower portion, a first transverse through-hole in the upper portion of each of said posts, a second transverse through-hole in the lower portion of each of said posts, attachment means to detachably attach said frame to and flat against said railing bars, said attachment means comprising a pair of spaced-apart slots formed in said upper beam, extending longitudinally thereof and respectively adjacent one of said posts, a clamp block for each slot, each clamp block having a pair of spaced-apart first through-bores and a central groove, two fastening bolts extending through said slot and through said spaced-apart first through-bores and wing nuts for said bolts to tighten said clamp block against one of said bars, said bars positioned in said central groove, a rectangular panel, of a size to nest within a boundary defined by said beams and posts, said panel having opposite back side edge portions, said back side edge portion including pivot means to selectively pivotally connect said opposite back side edge portions to either ones of said first and second transverse through-holes of said posts for pivotal movement of said panel between a folded position nesting within said boundary and overlapping said upper and lower beams, and an unfolded position normal to said frame, said panel thus pivotable at a higher level or at a lower level with respect to said posts, and brace means to releasably and selectively maintain said panel in unfolded position at said higher or at said lower level, whereby said panel, when unfolded, can be used as a table when at said higher level, and as a seat when at said lower level.

4,889,058

HEAT RECOVERY BOILER

Wen-Ching Yang, Murrysville; Suh Y. Lee, Monroeville, and Bozorg Ettehadieh, Wilkins Township, Allegheny County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 22, 1989, Ser. No. 313,569
Int. Cl.[4] F23B *5/00*; F23G *7/06*
U.S. Cl. 110—214 **14 Claims**



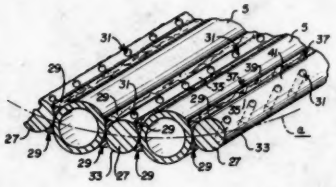
1. A waste heat boiler having a front wall, a back wall and two side walls cooperating to form a flue and a rotary combustor for burning municipal solid waste, extending through said front wall and discharging exhaust gases into said flue, said waste heat boiler comprising a protuberance with an asymmetrical nose shaped cross section having an arcuate tip disposed on the back wall above the rotary combustor and extending across the width of the back wall and into the flue to form the narrowest necked down portion of the flue adjacent said tip; and a plurality of nozzles disposed at the elevation of said tip of said nose shaped protuberance to direct jets of air inwardly and downwardly into the exhaust gases flowing through the flue to reduce the CO concentration in the exhaust gases to acceptable levels.

4,889,059

ROTARY COMBUSTOR WALL AND METHOD OF FORMING SAME

Graham A. Whitlow, Murrysville, and Suh Y. Lee, Monroeville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 13, 1989, Ser. No. 309,742
Int. Cl.[4] A47J *36/00, 36/24*
U.S. Cl. 110—246 16 Claims



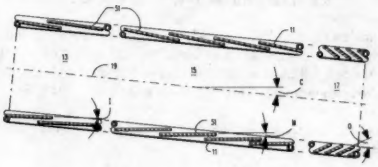
1. In a combustor having a plurality of water cooled pipes secured together along parallel axes to define an inner generally cylindrical surface, said pipes secured together by perforated strips so as to define a plurality of intermediate openings between said pipes, thereby providing gas porosity through said cylindrical surface, the improvement wherein said strips comprise cylindrical shaped metallic rods secured by welds to adjacent pipes, parallel said axes, and said perforations are provided between said pipes.

4,889,060

WEB FOR ROTARY COMBUSTOR

Bozorg Ettehadieh, Wilkins Township, Allegheny County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 27, 1989, Ser. No. 302,491
Int. Cl.[4] A47J *36/00, 36/24*
U.S. Cl. 110—246 8 Claims



1. A rotary combustor utilized to burn municipal solid waste comprising a plurality of spaced apart, parallel cooling pipes disposed in a circular array to form a generally cylindrical combustor barrel, said barrel being disposed for rotation on an inclined axis so that the inlet end of the barrel is above the outlet end and a plurality of generally flat plates being disposed between contiguous cooling pipes, the plates being disposed generally parallel to each other in descending order from the inlet to the outlet end of the combustor barrel with side margins of the plates welded to the pipes, with end margins overlapping a distance L and with a space D extending between adjacent plates to allow combustion air to flow therethrough.

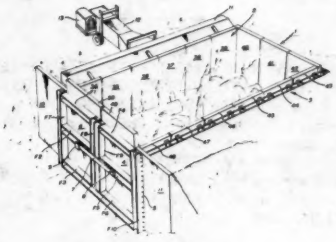
4,889,061

REFRACTORY BIN FOR PIT BURNING

Donald L. McPherson, and Tony L. McPherson, both of Tifton, Ga., assignors to McPherson Systems, Inc., Tifton, Ga.

Filed Feb. 1, 1989, Ser. No. 305,420
Int. Cl.[4] F23M *5/00*
U.S. Cl. 110—336 15 Claims

1. A refractory bin of generally rectangular horizontal cross sectional configuration and having wall structures each comprising an upper and a lower pair of elongated horizontal vertically spaced generally parallel support beams each having a vertical flange defining a support edge along its upper surface, a first generally rectangular refractory panel arranged with its lower edge at the bottom of the bin and with its outer surface in flat face contacting relation with the vertical flanges of said lower pair of support beams, a plurality of brackets each having a horizontal part and a vertical part and being secured to the outer surface of said first refractory panel at least two of which brackets are arranged respectively to overlie the support edges of the vertical flanges of said lower pair of support beams, a second generally rectangular refractory panel arranged with the lower edge immediately above the upper edge of said first refractory panel, a second plurality of brackets each having a horizontal part and a vertical part and being secured to the outer surface of said second refractory panel, at least two of which brackets are arranged respectively to overlie the support edges of the vertical flanges of said upper pair of support beams, and anchoring means for securing at least one of said second plurality of brackets to its associated support beam.

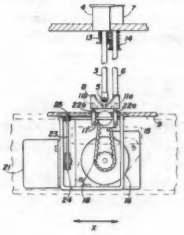


4,889,062

SEWING MACHINE WITH MEANS FOR FEEDING A WORKPIECE IN TWO DIRECTIONS

Akira Orii, Tokyo, Japan, assignor to Janome Sewing Machine Industry Co., Ltd., Kyobashi, Japan

Filed Nov. 7, 1988, Ser. No. 268,111
Int. Cl.[4] D05B *27/14*
U.S. Cl. 112—318 7 Claims



1. A sewing machine comprising:

first press means adapted to come into contact with a workpiece to be stitched to exert a downwardly directing pressure onto the workpiece;

second press means adapted to come into contact with the workpiece to exert a downwardly directing pressure onto the workpiece;

first drive means cooperating with said first press means and adapted to come into contact with the workpiece opposite

a point said first press means contacts the workpiece for feeding the workpiece in a first direction;

second drive means cooperating with said second press means and adapted to come into contact with the workpiece opposite a point said second press means contacts the workpiece for feeding the workpiece in a second direction substantially perpendicular to the first direction; and

control means for independently controlling said first and second drive means, thereby feeding the workpiece in said first and second directions in an independent and sequential manner.

4,889,063

MULTILAYER TEXTILE MATERIAL AND METHOD AND APPARATUS FOR PRODUCING THE SAME

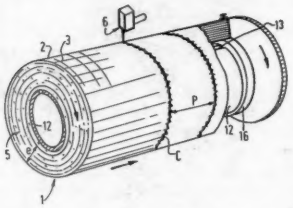
Bruno Bompard, Lyons; Christian Debaille, Caluire, and Alain Bruyere, Villefontaine, all of France, assignors to Brochier S.A., Cedex, France

Filed Dec. 5, 1986, Ser. No. 939,712

Claims priority, application France, Dec. 5, 1985, 85 18054

Int. Cl.[4] D05B *93/00*; B32B *7/08*

U.S. Cl. 112—402 **3 Claims**



1. A three-dimensional multilayer textile article comprising:

a plurality of superposed elementary layers each of which layers comprises a plurality of first threads extending in a first direction and a plurality of second threads extending in a second direction, said first and said second directions being non-parallel, and said layers being superposed and collectively having a three-dimensional shape in the article, the three-dimensional shape defining first and second end portions of the layers and corresponding to a body of revolution; and

a third thread joining said layers together, said third thread extending in said layers in a third direction that is non-parallel to each of said first and said second directions, and helically across said superposed layers from said first end portion thereof to said second end portion thereof.

4,889,064

SPORTFISHING OUTRIGGER DEVICES

Herbert E. Rupp, III, Stuart, Fla., assignor to Rupp Marine, Inc., Port Salerno, Fla.

Filed Dec. 12, 1988, Ser. No. 282,618

Int. Cl.[4] B63B *35/14*

U.S. Cl. 114—89 **8 Claims**

1. In an outrigger device for sportfishing boats having a tubular mast together with a plurality of truss cables positioned about and extending longitudinally of said mast to resist bending thereof and at least one spreader assembly carried by said mast comprising a plurality of tubular spreader arms each having an inboard end and an outboard end, each said spreader arm being associated with one of said cables to forcibly stand off said cable laterally from said mast, the improvement of spreader assemblies which comprise:

spreader arms formed of straight tubing having an inboard end and an outboard end,

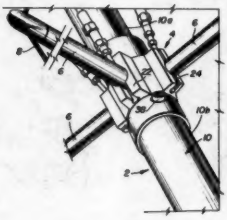
a cable guide through which one of said cables passes fitted into each said outboard end of said spreader arms, and

a spreader arm holder that comprises:

a collar sized to encircle said mast,

four bores in said collar positioned in a common transverse plane spaced 90° apart into which said inboard ends of said spreader arms are inserted, and

a lug extending laterally from the collar at each collar



bore location creating an extension of the respective bore to provide support to the inboard end of the spreader arm screwed into such bore,

each said lug including a longitudinal slot and a matching boring to admit the beaded end of a truss cable member, said matching boring being structured so that when said beaded end is operatively positioned therein and said spreader arm is positioned in said collar bore, said beaded end is captured in said collar.

4,889,065

METHOD OF TENSIONING AN ANCHOR LINE, IN PARTICULAR FOR TESTING AN ANCHOR, AND A DEVICE FOR CARRYING OUT THE METHOD, PARTICULARLY COMPRISING A CABLE OR CHAIN STOPPER

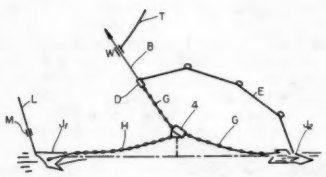
Rob van den Haak, Allege 114, 2925 BG Krimpen a/d Ijssel, Netherlands

Continuation of Ser. No. 45,783, Apr. 29, 1987, abandoned, which is a continuation of Ser. No. 722,789, Apr. 12, 1985, abandoned, which is a continuation of Ser. No. 443,951, Nov. 23, 1982, abandoned. This application Jan. 25, 1988, Ser. No. 147,664

Claims priority, application Netherlands, Nov. 23, 1981, 8105294

Int. Cl.[4] B63B *21/24*

U.S. Cl. 114—293 **4 Claims**



1. In an arrangement for tensioning a first anchor line, the arrangement having:

said first anchor line with a first end of said first anchor line connected to a first anchor for anchoring to the bed of a body of water, said first anchor line being for tensioning by hauling an opposite, second end of said first anchor line in a direction away from said first end of said first anchor line;

a device through which said first anchor line extends; and

at least one second anchor line having a first end connected to a second anchor for anchoring to said bed of said body of water at a distance from said first anchor and a second, opposite end connected to said device, the improvement wherein:

the device comprises one-way means for passing the first anchor lie therethrough in said direction for said tensioning of said first anchor line and for blocking the passage of said first anchor line therethrough in the opposite, tension-relieving direction of said first anchor line.

4,889,066

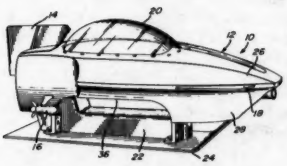
SUBMERSIBLE VEHICLE

Alan Neil, Lachine; Gary W. Hesketh, St. Bruno, and Gary Bojeck, Longueuil, all of Canada, assignors to Blue Space Submersibles, Inc., Quebec, Canada

Filed Jun. 2, 1988, Ser. No. 201,549

Int. Cl.[4] B63C *11/00*

U.S. Cl. 114—334 **9 Claims**



1. A non-watertight submersible vehicle comprising a hull, an open bottom cockpit having enclosure walls, separate and spaced inward from the hull, and defining open floodable compartments therebetween, and a canopy which is at least partially transparent mounted to the enclosure walls, compressed air storage means provided in the hull and conduit means communicating the compressed air storage means to the cockpit for providing an air bubble within the cockpit, a regulating valve provided on the conduit means for regulating the ingress of air from the compressed air storage means into the cockpit, and an air egress control means coordinated to determine with the regulating valve the volume of air within the cockpit forming the air bubble at varying depths.

4,889,067

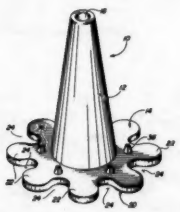
SELF RIGHTING ROAD MARKER

Albert M. Provence, Jr., 230 E. Pomona Ave., Monrovia, Calif. 91016

Continuation of Ser. No. 93,637, Sep. 8, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 317,131

Int. Cl.[4] E01F *9/10*

U.S. Cl. 116—63 C **8 Claims**



4. A self righting marker having a flexible base for urging said marker into an upright position after lateral tilting of said marker, said marker comprising in combination:

(a) a generally cone shaped hollow body for providing a visually perceivable marker, said body including an upper end and a lower end;

(b) a resilient and flexible planar base for biasing said body into an upright position after tilting of said marker, said base including:

(i) an inner annular base for engaging and retaining the lower end of said body and for resiliently flexing upon tilting of said marker;

(ii) an outer base concentric with said inner base for reducing the weight of said base while increasing the effective surface area of said base, said outer base including an undulating peripheral edge for defining a series of flaps and grooves, said flaps and grooves being radially oriented about said cone shaped hollow body, said outer base including a sufficient number of said flaps to position at least two of said flaps laterally outwardly of an imaginary line drawn across said base tangent to said cone shaped hollow body at the junction of said cone shaped hollow body and said inner annular base.

4,889,068

DECELERATION SENSOR

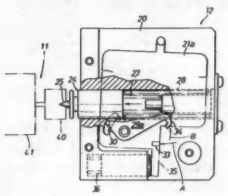
Hiroshi Tabata, and Akihiko Akiyama, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 8, 1988, Ser. No. 203,809

Claims priority, application Japan, Jun. 9, 1987, 62-143637; Jun. 9, 1987, 62-143639

Int. Cl.[4] H01H *35/14*

U.S. Cl. 116—203 **10 Claims**



1. A sensor device for releasing energy stored in an energy storage means upon detection of an acceleration or deceleration in excess of a certain threshold level, comprising:

energy releasing means urged by first spring means in a direction to cause the energy storage means to release energy thereof;

a pair of sensor masses;

means mounting said sensor masses for movement independently of one another;

second spring means for urging said masses into a neutral state and guiding said masses for individual movement against a spring force of the second spring means in response to inertial forces acting on said masses upon detection of an acceleration or deceleration in excess of a certain threshold level; and

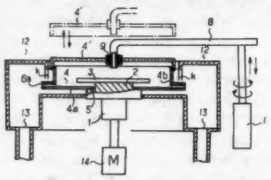
trigger means cooperating with the sensor masses for retaining the energy releasing means in its dormant state and responsive to movement of both said sensor masses under their inertial forces to activate said energy releasing means only when both of said sensor masses are moved under the inertial forces.

4,889,069

SUBSTRATE COATING EQUIPMENT

Kazushi Kawakami, Okayama, Japan, assignor to Tazmo Co., Ltd., Japan

Filed Nov. 22, 1988, Ser. No. 274,882
Claims priority, application Japan, Nov. 23, 1987, 62-295904
Int. Cl.[4] B05C *11/08*; C23F *1/02*
U.S. Cl. 118—50 5 Claims



1. A spin coating apparatus comprising;

(1) a spin head having a vacuum adsorption hole to set and fix a substrate on the upper surface of a spindle,

(2) A vessel means which rotates integrally with said spin head consisting of a vessel body having a peripheral side wall of a certain fixed height and a coverlid member in order to enclose said spin head, said coverlid member being able to be engaged with and disengaged from said vessel body, said peripheral sidewalls having a plurality of small holes or tube pipes at the lower peripheral part of said peripheral side wall,

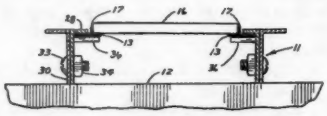
(3) a doughnut-like cup being placed and arranged so as to wrap said vessel means within the center portion of said cup, said cup having an air suction hole, whose dimension is larger than the outer diameter of said small holes or said tube pipes and is located on the internal periphery of said cup, so that excess coating can be exhausted thru said tube pipes or small holes via said air suction hole and the bottom of said cup is interconnected to a pipe equipped with an exhaust fan.

4,889,070

SYSTEM FOR THE TREATMENT OF EDGE SUPPORTED SUBSTRATES

Eric T. Sari, P.O. Box 41887, Plymouth, Minn. 55441

Continuation-in-part of Ser. No. 840,311, Mar. 14, 1986, Pat. No. 4,672,914, which is a continuation-in-part of Ser. No. 775,636, Sep. 13, 1985, Pat. No. 4,643,129. This application Oct. 10, 1986, Ser. No. 918,509
The portion of the term of this patent subsequent to Jun. 16, 2004, has been disclaimed.
Int. Cl.[4] B05C *11/00*
U.S. Cl. 118—64 15 Claims



1. A system for the thermal and liquid treatment of edge supported substrates comprising:

(A) an elongated tunnel treating chamber,

(B) a pair of elongated rail tracks extending through said chamber,

(C) support members for said rail tracks outside of said chamber on opposite ends thereof,

(D) a plurality of spaced apart parallel laterally extending pins projecting inwardly from said rail tracks,

(E) means on each of said rail tracks overlying and closely spaced from said pins throughout the length of said treating chamber,

(F) a lubricant-free closed loop tape conveyor on each of said rail tracks, said conveyor having a plurality of longitudinally aligned and longitudinally spaced vertical tabs spaced inwardly from the edges of the tape, said tape being in engagement with the top surfaces of said pins and partially underlying said rail means, whereby a substrate may be supported by its edges between said tapes as the tapes slide in loose sliding relation between said rail means and said pins, and

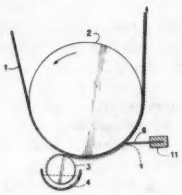
(G) means for moving said conveyors along said rail tracks.

4,889,071

UPSTREAMS INCLINED DOCTOR BLADE

Yngve Fundell, Vallingby, Sweden, assignor to Oy Wärtsilä AB, Helsinki, Finland

PCT No. PCT/FI86/00077, § 371 Date May 4, 1987, § 102(e) Date May 4, 1987, PCT Pub. No. WO87/00092, PCT Pub. Date Jan. 15, 1987
PCT Filed Jul. 7, 1986, Ser. No. 33,153
Claims priority, application Sweden, Jul. 5, 1985, 85033454
Int. Cl.[4] B05C *11/04*
U.S. Cl. 118—126 5 Claims



1. An arrangement for coating a running web of cardboard, paper, or like material with coating paste, comprising:

means defining a path of movement for the web,

a scraper knife support member, and

a scraper knife supported by the scraper knife support member and projecting towards said path of movement, the scraper knife being arranged so that it is inclined upstream relative to the path of movement of the web and the web meets the knife at an angle greater than 90°, the scraper knife being flexible and having a tip region that engages the web and is disposed substantially parallel to the running direction of the web.

4,889,072

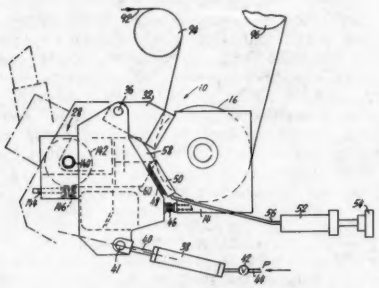
COATING APPARATUS

Leonard C. Krimsky, Englewood, N.J., assignor to Worldwide Converting Machinery, Allendale, N.Y.

Filed Apr. 18, 1989, Ser. No. 339,641
Int. Cl.[4] B05C *1/00*
U.S. Cl. 118—244 20 Claims

1. Apparatus for applying a thin coating to a web including in combination, a die assembly with an outer end having a discharge orifice for coating material, a backing roll having an outer portion of elastomeric material, means for positioning said die assembly and said backing roll in interfering relation-

ship to cause said die assembly to deform said outer roll portion, and means for supplying coating material to said die to



form a closed pocket of coating material covering said discharge orifice.

4,889,073

METHOD AND APPARATUS FOR COATING A WEB

Paul O. Meinander, Grankulla, Finland, assignor to Valmet Paper Machinery Inc., Helsinki, Finland

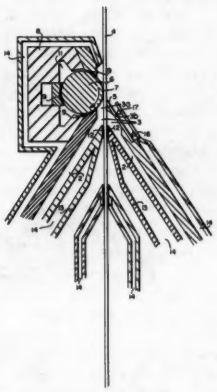
PCT No. PCT/FI85/00037, § 371 Date Dec. 17, 1985, § 102(e) Date Dec. 17, 1985, PCT Pub. No. WO85/04824, PCT Pub. Date Nov. 7, 1985

PCT Filed Apr. 4, 1985, Ser. No. 822,430

Claims priority, application Finland, Apr. 17, 1984, 841533

Int. Cl.⁴ B05D *3/12*

U.S. Cl. 427—356 **8 Claims**



1. A method for symmetrical two-sided coating and smoothing said coating of a moving web, e.g., a paper web, the direction of movement of which is substantially upwards, which method comprises

feeding the web through a closed coating chamber; and smoothing the coating immediately thereafter by passing the web through an outlet of the chamber, which outlet comprises a nip formed by a flexible blade and a round rod rotatably mounted on bearings adapted to support it along its length; and rotating said rod against the direction of movement of the web.

4,889,074

MOVABLE ACCOMODATION OR CONTAINER IN WHICH IS ARRANGED APPARATUS FOR AUTOMATIC MILKING OF AN ANIMAL

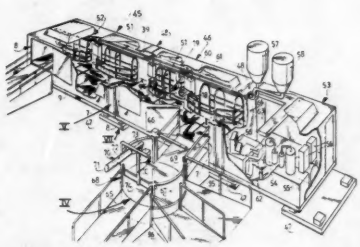
Jeroen K. J. Verbrugge, Delft, and Erik A. Aurik, Amsterdam, both of Netherlands, assignors to Multinorm B.V., Nieuw-Vennep, Netherlands

Filed Nov. 16, 1987, Ser. No. 121,341

Claims priority, application Netherlands, Nov. 19, 1986, 8602942

Int. Cl.⁴ A01J *5/00*

U.S. Cl. 119—14.03 **8 Claims**



3. A movable accommodation for animals to be milked which comprises in combination:

a shelter for animals having opening means for allowing animals to enter and exit the shelter and an elevated floor for supporting the animals in the shelter,

first means for leading an animal to be milked to a first location adjacent a first milking station within the shelter and for confining the animal to said first location,

first machine milking means at said first machine milking station for automatic milking of an animal, said first machine milking means including a first milking rack having teat cups,

second means for leading an animal to be milked to a second location adjacent to a second milking station within the shelter and for confining the animal to said second location,

second machine milking means at said second machine milking station for automatic milking of an animal, said second machine milking means including a second milking rack having teat cups,

an elongated guide means having opposite ends which is located below a side of said elevated floor and which extends between said first and second milking stations, and

a robot means which is movable back and forth along said elongated guide means and between said first and second milking stations for respectively positioning the milking racks of said first and second machine milking means into operative relation to the teats of a respective animal at said first and second locations.

4,889,075

DUCK HOUSE

James E. Byrns, 1027 2nd Ave., South Clinton, Iowa 52732

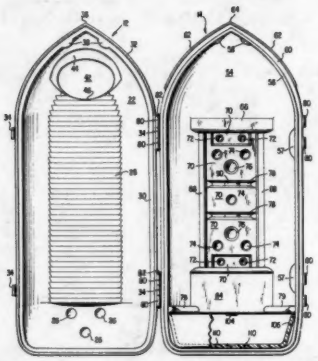
Filed Sep. 7, 1988, Ser. No. 241,175

Int. Cl.⁴ A01K *31/00*

U.S. Cl. 119—23 **8 Claims**

1. A duck house of generally cylindrical form and adapted to be vertically mounted on an independent, stationary support, the house comprised of two vertically extending and generally semi cylindrical sections each of integral, spaced apart double walled, blow molded construction, one section being a front and the other a rear section, the side edges of each section carrying means for releasably and independently hingedly connecting said side edges together to thereby permit the front section to hinge about either side edge of the rear section, the

upper portion of the front section provided with an oval entrance opening, an integrally formed set of saw teeth like horizontal steps vertically running along and down the interior wall of the front section for a distance of at least fifteen inches and whose steps commence contiguous to the lower portion of said oval opening, the rear section provided with means to



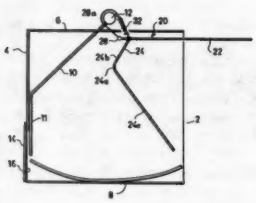
mount it on an independent stationary support, said mounting means defined by a plurality of weldments integrally connecting the inner and outer walls of the rear section and having fastener receiving hollow openings on the inner wall of the rear section, whereby the rear section can be mounted on a support in any one of a plurality of fastener modes.

4,889,076

NEST TRAP FOR LAYING HENS

William Cohen, Ichud, Israel, assignor to M. G. H. Automation Systems, Ichud, Israel

Filed May 6, 1988, Ser. No. 190,990
Claims priority, application Israel, Feb. 10, 1986, 77833
Int. Cl.[4] A01K *31/16*
U.S. Cl. 119—50 **17 Claims**



1. A trap for a laying hens nest having a front entrance through which the hen enters and exits, a back wall, and a top, which trap is movable by the hen when entering the nest to a closed position obstructing the front entrance to prevent another hen from entering, the trap being movable by the hen when leaving the nest to an open position to permit another hen to enter the nest; said trap comprising:

a front member pivotably mounting to the top of the nest;

a back member mounted to the upper end of the front member;

and a spring providing an over-center spring connection between said two members effective to stably maintain the back member within the nest and the front member in a non-obstructing position with respect to the front entrance in the open position of the trap, and effective to stably maintain the back member near the back wall of the nest and the front member obstructing the front entrance, in the closed position of the trap;

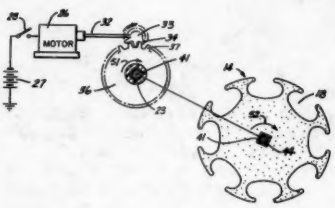
said back member being pivotably mounted to the upper end of said front member and carrying a limit element engageable by the front member between the pivot point of the back member to the front member and the pivot point of the front member to the top of the nest, such that when the trap is in its open position and the back member is pivoted by a hen entering the nest via its front entrance, said limit element engages the upper end of the front member to cause the back member to be pivoted by the front member to the trap closed position wherein the front member obstructs the front entrance.

4,889,077

AUTOMATIC PET FEEDER

Zinon C. Possis, 4801 Rolling Green Pkwy., Edina, Minn. 55436

Filed Jul. 14, 1988, Ser. No. 218,974
Int. Cl.[4] H01K *5/07*
U.S. Cl. 119—51.11 **18 Claims**



1. An apparatus for feeding food to an animal comprising: a base mountable on a support, the base comprising a housing having an internal chamber, a shaft rotatably mounted on the housing having an end projected away from the housing, said housing having a boss providing a bearing support for the shaft, wheel means mounted on the shaft for rotation with said shaft, said wheel means having a plurality of pockets open to outer portions of the wheel means for holding food, said wheel means having oppositely extending flanges located partly over each pocket to restrict the size of the opening to each pocket, and drive means mounted on the housing for rotating the wheel means whereby on rotation of the wheel means food in a pocket facing in a downward direction will fall from the downwardly facing pocket to a feeding location.

4,889,078

HOG FEEDER

Gordon D. Smiley, Rte. 4, Box 245, Greensburg, Ind. 47240

Filed Mar. 12, 1986, Ser. No. 838,663
Int. Cl.[4] A01E *5/00*
U.S. Cl. 119—53.5 **25 Claims**

1. A hog feeder comprising:

an annular trough member including an upstanding outer peripheral wall and an inner wall;

an upstanding central member having a top surface defining a plateau, and an upstanding wall defining said inner wall of said annular trough;

a vertical post extending upwardly from said central member;

a hopper mounted upon said post and having a bottom edge disposed above and spaced from said top surface,

said hopper having a bottom opening therein;

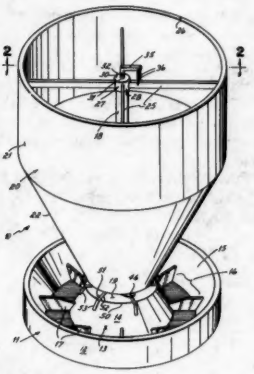
the spacing between said hopper and said top surface controlling the rate of discharge of feed from said hopper;

a plurality of radially extending arms disposed intermediate said bottom opening and said top surface, and mounted for rotation about said post;

said arms comprising a horizontal portion and an endwise portion disposed in said trough member;

said endwise portion being exposed for engagement by a hog for imparting rotary motion to said arms;

said endwise portion extending radially across only a small fraction of the width of said trough whereby a hog can



continue to feed from said trough without being struck by said arms when said arms are rotating;

said arms being effective to cause feed discharged from said hopper opening to be shifted outwardly over said top surface and to drop unimpeded from said top surface into said trough.

4,889,079

CYLINDER HEAD COOLING STRUCTURE FOR WATER-COOLED MULTICYLINDER ENGINE

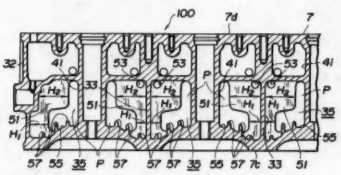
Akihiko Takeda, Saitama; Hiroyuki Kaneda, Tokyo, and Shigeru Suzuki, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 14, 1988, Ser. No. 270,958

Claims priority, application Japan, Nov. 17, 1987, 62-290305

Int. Cl.[4] F02F *1/38*

U.S. Cl. 123—41.82 R **9 Claims**



1. A cooling structure in a cylinder head of a water-cooled multicylinder engine, comprising:

a plurality of partitions disposed between cylinders and in a water jacket defined in the cylinder head;

a plurality of plug insertion tubes disposed vertically above substantially central portions of the respective cylinders;

a plurality of cooling inlet ports disposed on one side of said plug insertion tubes and a cooling water discharge port disposed on the other side of said plug insertion tubes;

a plurality of walls projecting from said partitions toward said plug insertion tubes; and

each of said walls including a lower projecting portion having a relatively small width near a wall of the cylinder head above a combustion chamber defined in each of said cylinders and an upper projecting portion having a relatively large width.

4,889,080

CYLINDER HEAD FOR AN INTERNAL COMBUSTION ENGINE

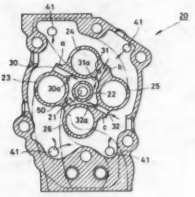
Hideo Oguri, Oyama, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed May 24, 1988, Ser. No. 198,547

Claims priority, application Japan, May 26, 1987, 62-78128

Int. Cl.[4] F02F *1/36*

U.S. Cl. 123—41.82 R **4 Claims**



1. A cylinder head for an internal combustion engine of a four-valve cylinder having two suction valves and two exhaust valves per cylinder, outer walls for suction holes through which said suction valves are inserted and outer walls for exhaust holes through which said exhaust valves are inserted are connected by means of bridge members, said outer walls surround an outer wall for a fitting hole through which a fuel injection nozzle is fitted, the outer walls for said suction holes and said exhaust holes and the outer wall for said fitting hole form a water jacket which surrounds the outer wall for said fitting hole, characterized in that each of at least three of said bridge members includes a machined cooling water passage, a foremost end of each machined cooling water passage is oriented tangential and directed in one rotational direction relative to the outer wall for the fitting hole whereby cooling water exiting from the cooling water passages swirls in said one rotational direction in the water jacket along the outer wall of said fitting hole.

4,889,081

VEHICLE SUCTION SYSTEM

Tadayuki Ozaki, Shizuoka, Japan, assignor to Suzuki Jidosha Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed Apr. 28, 1989, Ser. No. 345,465

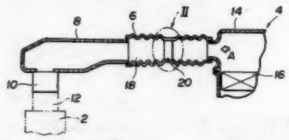
Claims priority, application Japan, May 23, 1988, 63-67907[U]

Int. Cl.[4] F02M *35/10*

U.S. Cl. 123—52 M **4 Claims**

1. A vehicle suction system having a rectifying unit installed in the suction air passage of the suction-air-passage assembly of an internal combustion engine for a vehicle, the rectifying unit

having many through-holes along the suction air flow direction divided by partitions and the partitions having wedge-like



cross sections which are alternately inversely oriented relative to the suction air flow direction.

4,889,082

INTAKE SYSTEM FOR MULTIPLE-CYLINDER ENGINE

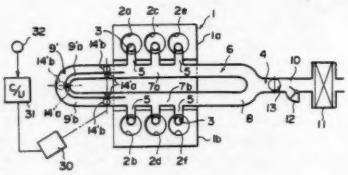
Mitsuo Hitomi; Yasuhiro Yuzuriha; Toshihiko Hattori, and Akinori Yamashita, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Sep. 28, 1988, Ser. No. 250,413

Claims priority, application Japan, Oct. 1, 1987, 62-248368

Int. Cl.[4] F02B *27/00*

U.S. Cl. 123—52 M **6 Claims**



1. An intake system for a multiple-cylinder engine having a plurality of cylinders comprising first and second branch passages, a plurality of discrete intake passages for connecting the cylinders to one of the first and second branch passages, an intake air supply passage, an upstream side communicating passage for communicating the first and second branch passages with each other and with the downstream end of the intake air supply passage, and a downstream side communicating passage comprising a plurality of sub-passages separated by partition walls for communicating the downstream side ends of the first and second branch passages with each other, the firing order being set so that the cylinders connected to the first branch passage by way of the respective discrete passages do not fire one after another and cylinders connected to the second branch passage by way of the respective discrete passages do not fire one after another, and the first and second branch passages and the upstream side and downstream side communicating passages forming a circular passage for supercharging the engine by resonance tuning effect of intake air, characterized in that

said downstream side communicating passage is provided with a cross-sectional area changing means including a valve means which selectively opens and closes the sub-passages for switching the effective cross-sectional area of the downstream side communicating passage among at least a full closed state, a part opening state and a full opening state according to the engine speed to increase the effective cross-sectional area of the downstream side communicating passage with increase in the engine speed.

4,889,083

INTAKE SYSTEM FOR V-TYPE MULTI-CYLINDER INTERNAL COMBUSTION ENGINE

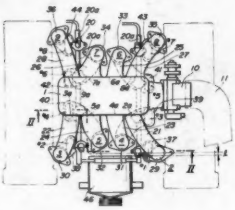
Masayuki Honma, Yokohama, and Akihiko Masatate, Fujisawa, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

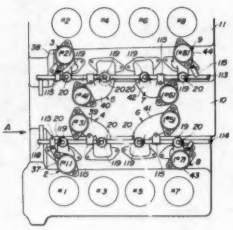
Filed Feb. 10, 1989, Ser. No. 308,553

Claims priority, application Japan, Feb. 15, 1988, 63-30886; Mar. 24, 1988, 63-38793[U]

Int. Cl.[4] F02B *75/22*

U.S. Cl. 123—52 MV **11 Claims**





1. An intake system for a V-type multi-cylinder internal combustion engine, comprising:

an elongated collector housing disposed between two rows of cylinders in such a way as to longitudinally extend across said rows at substantially the center thereof;

a plurality of intake pipes of substantially the same length, extending independently from said collector housing and communicated with intake ports for said cylinders, respectively;

said collector housing having at the opposite ends spaced along said rows of said cylinders, a plurality of openings in two rows extending in the direction transverse to said rows of said cylinders;

said intake pipes being connected to said collector housing in such a way as to communicate with said openings, respectively;

said intake pipes extending curvedly away from said openings and in such a way as to go toward said rows of cylinders and away from said collector housing; and

said intake pipes further extending curvedly toward said intake ports and in such a way as to have adjacent said intake ports, circumferential walls which extend across

the axes of said intake ports and thereafter extend nearly coaxially with said intake ports.

4,889,084

VALVE CONTROL DEVICE WITH MAGNETIC VALVE FOR INTERNAL COMBUSTION ENGINES

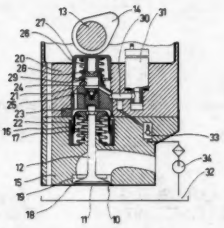
Helmut Rembold, Stuttgart, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Feb. 17, 1989, Ser. No. 311,803

Claims priority, application Fed. Rep. of Germany, May 7, 1988, 3815668

Int. Cl.[4] F01L *1/12, 1/24;* **F02D** *13/02*

U.S. Cl. 123—90.12 **30 Claims**



1. A valve control device for controlling the opening and closing time of a cylinder valve (**10**) of an internal combustion engine, the cylinder valve being actuated by a valve control cam (**14**) of a camshaft (**13**) via an axially displaceable valve tappet (**12**), a stroke transmission chamber (**29**) disposed between the valve control cam and the valve tappet and a conduit for varying the axial length of said stroke transmission chamber between the valve control cam and the valve tappet said conduit is controllable by a magnetic valve (**31**) for draining out and supplying fluid, said conduit discharging at one end in a fluid reservoir (**36**), said fluid reservoir (**36**) is integrated with the magnetic valve (**31**) and by deflection of a valve member (**38**) of said magnetic valve (**31**) develops into a reservoir piston in the opening direction past a position that opens up a flow opening (**37**) to said fluid reservoir (**36**).

4,889,085

VALVE OPERATING DEVICE FOR INTERNAL COMBUSTION ENGINE

Toru Yagi, Tokyo; Yoshihiro Fujiyoshi, Kanagawa; Takatoshi Aoki, Tokyo, and Yasuhiro Urata, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

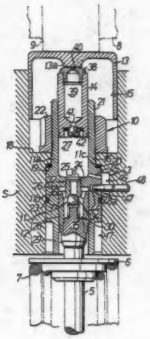
Filed Nov. 18, 1988, Ser. No. 273,459

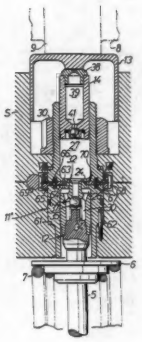
Claims priority, application Japan, Nov. 19, 1987, 62-292623

Int. Cl.[4] F01L *9/02*

U.S. Cl. 123—90.12 **5 Claims**

5. In a valve operating device for an internal combustion engine including a valve piston operatively coupled to an intake or exhaust valve and communicates with a working oil chamber that is pressurized for operating the valve piston, an improvement comprising a bypass passage for returning the working oil to the working chamber during closing of the intake or exhaust valve, and a variable restriction mechanism capable of varying a cross-sectional area for said returning oil





flow through said bypass passage for selectively varying the valve closing characteristics.

4,889,086

AUTOMATIC TIMING VARIATION DEVICE FOR AN INTERNAL COMBUSTION ENGINE

Pier L. Scapecchi, Saronno; Giovanni Coghi, Gerenzano, and Paolo Lanati, Piacenza, all of Italy, assignors to Alfa Lancia Industriale S.p.A., Arese, Italy

Filed Apr. 26, 1989, Ser. No. 343,288

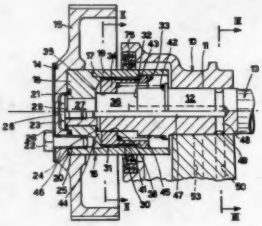
Claims priority, application Italy, May 5, 1988, 20464 A/88

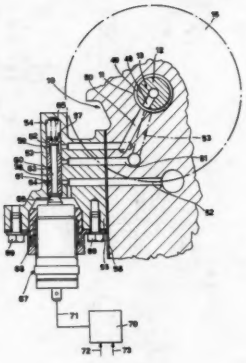
Int. Cl.[4] F01L *1/34*

U.S. Cl. 123—90.15 **11 Claims**

1. A device for automatically varying the timing, or angular position, of a camshaft (**13**) relative to the crankshaft of an internal combustion engine, comprising a cylinder (**16**) rigid with a pulley (**15**) rotation by the crankshaft, and a piston (**33**) provided with restraint means which keep said piston (**33**) normally rotationally rigid with said cylinder (**16**) and with said camshaft (**13**) while allowing it to undergo axial movement relative to said cylinder and camshaft and to undergo rotation relative to said cylinder, said device also comprising elastic means (**41**) engaged with said piston (**33**) to retain it in a first end-of-travel position, and valve means (**57**) arranged to feed and discharge pressurized fluid to and from said piston (**33**) in order to move it between said first end-of-travel position and a second end-of-travel position and controlled by a

control center (70) in accordance with chosen engine parameters, characterised in that said restraint means consist of helical groove connections (30, 31) and prismatic pair connections (37, 38 or 39, 40).





4,889,087

TENSIONING ARRANGEMENT FOR A POWER-TRANSMITTING ELEMENT INCORPORATED IN A TRANSMISSION

Lars Bergsten, Järna, Sweden, assignor to Saab-Scania Aktiebolag, Sweden

Filed May 16, 1989, Ser. No. 352,760
Claims priority, application Sweden, May 19, 1988, 88018700
Int. Cl.[4] F01L *1/04*; F16H *7/08*
U.S. Cl. 123—90.31 **17 Claims**

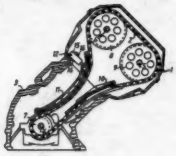
1. A tensioning arrangement for an endless-path flexible, power transmitting element, comprising:

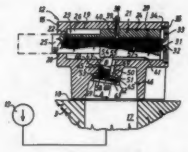
a cylinder;

a piston displaceable in the cylinder and means between the piston and the power-transmitting element bearing against the power-transmitting element for increasing the tension of the element; the piston being shaped with respect to the shape of the cylinder for delimiting a space in the cylinder and the space is placed such that pressurizing the space urges the piston away from tensioning the element;

a spring for imparting to the piston a first force for urging the piston to move toward tensioning the power-transmitting element; and

a pressure source connected to the space for feeding a pressure medium to the space only when the power transmitting element is in operation, for pressurizing the space for applying a second force on the piston directed counter to the first force on the piston for imparting to the piston a limited movement for reduced force effect on the power-transmitting element.



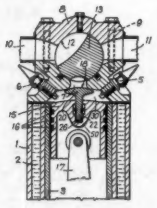


4,889,088

FLUID FLOW CONTROL METHOD AND APPARATUS FOR A POSITIVE DISPLACEMENT ENGINE OR COMPRESSOR

Michel Berger, Castelnau de Medoc, France, assignor to Pradom Limited, London, England

Filed Dec. 15, 1988, Ser. No. 284,655
Claims priority, application France, Dec. 16, 1987, 87 17594
Int. Cl.[4] F01L *3/00*
U.S. Cl. 123—188 B **21 Claims**



1. A method for providing a sealing means to control the forced flow of a fluid in a structure having at least one admission duct, at least one exhaust duct, a treatment chamber with at least one port communicating selectively with the admission duct and the exhaust duct, and a piston reciprocating in the treatment chamber between a bottom dead center position and a top dead center position, said method comprising the steps of:

(a) providing a suitable sealing means in controlled relation to said piston for insuring substantially perfect sealing between said port and said treatment chamber when said piston is in the immediate vicinity of said top dead center position;

(b) activating said sealing means at an appropriate moment for insuring sealing between said port and said treatment chamber when said piston is in the immediate vicinity of top dead center position; and

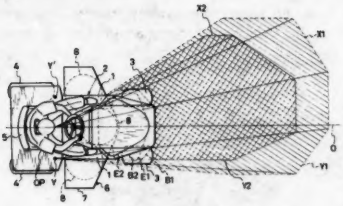
(c) deactivating said sealing means when said piston is in a position other than in the immediate vicinity of top dead center position, in order to allow said fluid to pass through said port.

4,889,089

WORK VEHICLE

Tetsuzo Fujikawa, Kobe; Makizo Hirata, and Shinichi Tamba, both of Kakogawa, all of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Japan

Continuation of Ser. No. 808,290, Dec. 12, 1985, abandoned.
This application Jul. 1, 1988, Ser. No. 214,833
Claims priority, application Japan, Dec. 24, 1984, 59-275671
Int. Cl.[4] A01D *35/26*
U.S. Cl. 123—195 HC 2 Claims



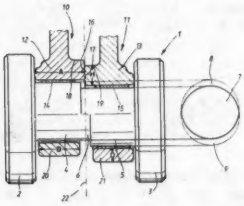
1. In a work vehicle powered by a two-cylinder internal combustion engine encased in an engine compartment that is situated in front of a driver's station; the improvement which comprises said internal combustion engine being of a vertical crankshaft, V-type and having a connecting rod connected to each piston, a single crank pin on said vertical crankshaft adapted for connection to both of said connecting rods, said internal combustion engine having an enlarged upper cross-sectional area in a plane perpendicular to the crankshaft longitudinal axis due to the spreading of the cylinders in forming a V-block configuration, said enlarged engine area being located closer to said driver's station than the rest of said engine, said engine compartment including a hood forming portion which includes a front part that is forwardly declining and tapered along both sides thereof, said hood forming portion being shaped and sized so as to contain therein said engine in close surrounding.

4,889,090

CRANKSHAFT DRIVE OF AN INTERNAL-COMBUSTION ENGINE OF V-TYPE

Johannes Werner, Waiblingen; Walter Kerschbaum, Fellbach, and Rolf Heinrich, Weinstadt, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Aug. 22, 1988, Ser. No. 234,931
Claims priority, application Fed. Rep. of Germany, Aug. 22, 1987, 3728014
Int. Cl.[4] F02B *75/32*
U.S. Cl. 123—197 AC 4 Claims



1. Crankshaft drive of an internal-combustion engine of V-type with a crankshaft, which has two mutually offset crank pins between two crankshaft webs in each case which are interconnected by means of a narrow intermediate element and on each of which pins a connecting rod is mounted by its large connecting rod eye having a width A, each connecting rod having first and second sides and being guidable on the first side which has a reduced height by an adjacent crankshaft web and the intermediate element having a cross-sectional area which substantially corresponds to an overlapping of cross-sectional areas of the two crank pins,

wherein each connecting rod is guided on the second side by means of an axial stop surface arranged on the connecting rod eye of the adjacent connecting rod, the width A of each connecting rod eye region being greater than a width of the associated crank pin,

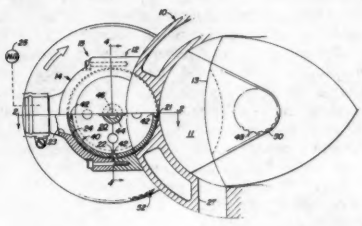
and wherein the axial stop surfaces each have a first height so large that in every crankshaft position there is a cohesive overlapping of the axial stop surfaces of the connecting rods and wherein the axial stop surfaces each have a broadened height which extends radially across the cross-sectional area of the respective connecting rod eye.

4,889,091

ROTARY VALVE FOR NATURAL GAS ROTARY ENGINE

Murray Berkowitz, Woodcliff Lake, and John Abraham, Wayne, both of N.J., assignors to John Deere Technologies International, Inc., Moline, Ill.

Filed Oct. 11, 1988, Ser. No. 255,282
Int. Cl.[4] F02B *53/06*
U.S. Cl. 123—219 5 Claims



1. A rotary engine having a housing, a crankshaft and a three-sided rotor rotatable therein and coupled to the crankshaft, the housing defining an inner running surface having a two-lobed epitrochoidal profile defined by a minor axis and a major axis, the housing having an air intake port and a fuel intake port, characterized by:

the fuel intake port extending radially through a portion of the running surface near the end of the major axis towards the air intake port;

a supply of gaseous fuel; and

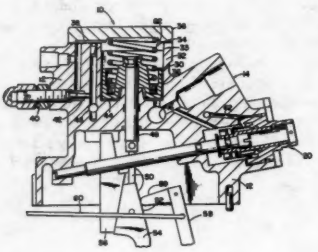
a valve for controlling communication of the gaseous fuel to the fuel intake port, the value operating to open communication between the supply and the fuel intake port as each rotor side faces the fuel intake port, the valve comprising a housing enclosing a cylindrical chamber therein, an inlet communicating the supply with the chamber and an outlet communicating the chamber with the fuel intake port, and a valve member rotatable within and slidably and sealingly engaging walls of the chamber, the valve member having a passage extending radially therethrough and the valve member being rotatable to an open position wherein the passage communicates the inlet with the outlet and to a closed position wherein communication between the inlet and outlet is closed.

4,889,092

FUEL VISCOSITY/DENSITY COMPENSATION DEVICE

Norvan W. Bostwick, Longmeadow, Mass., assignor to AIL Corporation, Columbia, S.C.

Filed Jul. 18, 1985, Ser. No. 756,471
Int. Cl.[4] F02M *39/00*
U.S. Cl. 123—381 5 Claims



1. A fuel viscosity compensating device for providing an output which may be used to regulate the output of a fuel pump based on the viscosity of the fuel which comprises:

a housing including walls defining a pressure chamber and a fuel inlet;

a piston located within the pressure chamber and being capable of reciprocating motion within the pressure chamber, said piston dividing the pressure chamber into a regulated pressure cavity on one side of the piston and a servo pressure chamber on the other side of the piston, said piston being sized relative to the housing walls to define a restricted orifice there between extending from the regulated pressure cavity to the servo pressure cavity to allow fuel to flow there between while undergoing a pressure decrease based on the viscosity of the fuel;

a piston spring positioned to bias the piston toward the regulated pressure cavity;

a pressure regulator connected to receive fuel under pressure from the fuel inlet and to deliver said fuel at a reduced pressure to the regulated pressure cavity;

conduit means connected to receive fuel from the servo pressure cavity;

swirl means connected to receive fuel from the conduit means for effecting a pressure reduction of the fuel flowing there through dependent upon the viscosity of fuel thereby effecting the pressure of the fuel in the servo chamber; and

fuel control means connected to the piston to be displaced with the piston in response to the viscosity of the fuel to thereby provide an output representative of the fuel viscosity.

4,889,093

THROTTLE OPENING CONTROLLER

Yukinori Nishiyama; Hideaki Fujioka, both of Itami; Hisaaki Yamaguchi, Hiroshima; Toshiki Ikeda, Hiroshima, and Keisuke Miyoshi, Hiroshima, all of Japan, assignors to Sumitomo Electric Industries, Ltd. and Mazada Motor Corporation, both of, Japan

Filed Nov. 4, 1988, Ser. No. 267,478
Claims priority, application Japan, Nov. 6, 1987, 62-281355
Int. Cl.[4] F02D *37/00;* F02P *5/02*
U.S. Cl. 123—400 4 Claims

1. A throttle opening controller for a motor vehicle, comprising:

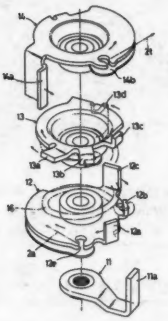
an output shaft;

a driving means for driving said output shaft;

a motor lever fixedly mounted on said output shaft; and

a ring unit comprising an accelerator ring, a motor ring and a throttle ring all rotatably mounted on said output shaft;

said motor lever and said three rings being adapted to turn independently of one another in two opposite directions, that is a throttle-opening direction and a throttle-closing direction, said accelerator ring being connected through a first wire to an accelerator pedal so as to be turned with the reciprocating movement of said accelerator pedal and having an engaging means adapted to engage and turn said throttle ring in said throttle-opening direction, said motor ring being coupled to said accelerator ring through an elastic means so as to be turned with said accelerator ring and having an engaging means adapted to engage and turn



said throttle ring in said throttle-opening direction, said throttle ring being connected through a second wire to a throttle for a vehicle engine and biased by a spring means in said throttle-closing direction, the opening of said throttle being determined by the angular position of said throttle ring, said motor lever having engaging means adapted to engage said motor ring to prevent it from turning in said throttle-opening direction, said throttle ring being adapted to move in the throttle-opening direction together with said accelerator ring when said accelerator ring is turned in the throttle-opening direction, even if said motor ring is prevented by said motor lever from turning in the throttle-opening direction.

4,889,094

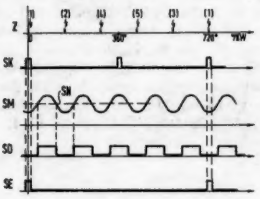
METHOD FOR RECOGNIZING THE POWER STROKE OF A CYLINDER OF AN INTERNAL COMBUSTION ENGINE

Hans-Ernst Beyer, Oberriexingen; Jörg Bonitz, Mühlacker; Robert Entenmann, Benningen; Siegmar Förster, Schwieberdingen; Rochus Knab, Kornwestheim; Walter Künzel, Ludwigsburg; Wolfgang Kugler, Vaihingen/Enz; Alfred Mahlberg, Freiberg; Bernhard Miller; Matthias Philipp, both of Stuttgart; Siegfried Rohde, Schwieberdingen; Stefan Unland, Ludwigsburg; Walter Viess, Schwieberdingen; Herbert Winter, Asperg, and Jürgen Zimmermann, Schwieberdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE87/00100, § 371 Date Nov. 23, 1987, § 102(e) Date Nov. 23, 1987, PCT Pub. No. WO87/05971, PCT Pub. Date Oct. 8, 1987
PCT Filed Mar. 6, 1987, Ser. No. 138,845
Claims priority, application Fed. Rep. of Germany, Apr. 4, 1986, 3611262
Int. Cl.[4] F02P *5/04, 1/08;* F02B *5/02*
U.S. Cl. 123—414 9 Claims

1. A method for the recognition of the power stroke of a cylinder of an internal combustion engine having an odd number of cylinders, comprising the steps of forming, form a single sensor and transducer disk a first signal which depends on a

predetermined crankshaft angle; forming a second signal from said same single sensor and transducer disk which corresponds



to the basic frequency of the combustion events in the engine; and combining the first and second signals according to a logic function to generate a power stroke recognition signal.

4,889,095

IGNITION TIMING CONTROL SYSTEM

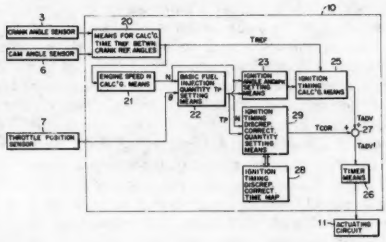
Yoshiyuki Sogawa, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 9, 1988, Ser. No. 268,983

Claims priority, application Japan, Nov. 9, 1987, 282366; Nov. 11, 1987, 285066

Int. Cl.[4] F02D *5/00*

U.S. Cl. 123—418 **2 Claims**



1. An ignition timing control system for an internal combustion engine with at least one fuel injector, having a cam angle sensor for detecting a specific cam angle and for generating a cam angle signal, a crank angle sensor for detecting a first reference crank angle and a second reference crank angle provided at an advancing side of an ignition timing of the first reference crank angle and for generating crank angle signals corresponding to the first and second reference crank angles, a throttle position sensor for detecting an opening degree of a throttle valve of the engine and for generating a throttle position signal corresponding to the opening degree of the throttle valve, crank angular velocity calculating means responsive to the crank angle and cam angle signals for calculating an average crank angular velocity between the first and second reference crank angles and for generating a crank angular velocity signal, and engine speed calculating means responsive to the crank angular velocity signal for calculating an engine speed and for generating an engine speed signal, and said system comprises:

basic fuel injection quantity calculating means responsive to the engine speed signal and the throttle position signal for calculating a basic fuel injection quantity,

ignition angle setting means responsive to the engine speed signal and an output signal of the basic fuel injection quantity calculating means for setting an ignition angle from a position detected to the first reference crank angle to an ignition position and for generating an ignition angle signal,

ignition timing calculating means responsive to the ignition angle signal and the crank angular velocity signal for calculating an ignition timing converted from the ignition angle and the average crank angular velocity and for generating an ignition timing signal,

timer means responsive to an output signal of the ignition timing correcting means for operating the fuel injector, and

setting means for setting the first reference crank angle and the second reference crank angle to coincide with the average crank angular velocity and an average crank angular velocity from the position detected to the first reference crank angle to the ignition position so as to control with high precision to a set ignition advance value even at a time of transient operational state of the engine.

4,889,096

FUEL INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES

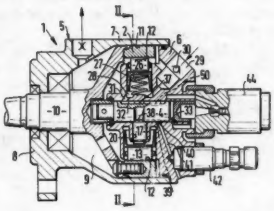
Andre Brunel, St. Genis Laval, France, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Apr. 4, 1989, Ser. No. 333,054

Claims priority, application Fed. Rep. of Germany, May 14, 1988, 3816508

Int. Cl.[4] F02M *39/00*

U.S. Cl. 123—450 **9 Claims**



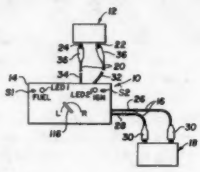
1. A fuel injection pump for internal combustion engines having a distributor **(4)** rotating in a distributor cylinder **(33)** and having at least one pump piston **(17)** disposed in a pump housing **(1)** radially relative to the distributor **(4)** and defining a pump work chamber **(38)**, which pump piston is driven by cams of a cam race **(12)** of a cam ring **(2)**, following the cam race **(12)**, the pump work chamber **(38)** is supplied with fuel by a fuel feed pump via a supply conduit controlled by control grooves **(32)** in the distributor **(4)**, simultaneously with radial movement of the pump piston **(17)**, a feed piston **(14)** embodied as a feed pump and urged by a spring toward the cam race **(12)** and likewise disposed radially to the distributor **(4)** and driven by the cam race **(12)**, said feed piston **(14)** defining a pump interior **(28)** in a guide cylinder **(24)**, said pump interior communicating on the one hand, in the intake stroke of the feed piston **(14)** via a control valve **(30)**, with a fuel inlet line connected with a fuel reservoir, and, on the other with the control valve **(30)** closed, the pumping stroke of the feed piston **(14)** communicating with the pump piston **(17)** via said pump work chamber **(38)** and can simultaneously be made to communicate with the fuel reservoir, via a pressure limiting valve **(43)**.

4,889,097

ELECTRONIC FUEL CONTROL DEVICE AND METHOD

Fred Bevill, Rt. 4, Box 235, Denison, Tex. 75020, and Theodore P. Kaufman, Richardson, Tex., assignors to Fred Bevill, Denison, Tex.

Filed Feb. 29, 1988, Ser. No. 162,197
Int. Cl.[4] F02D 41/02; F02P 15/00
U.S. Cl. 123—478 19 Claims



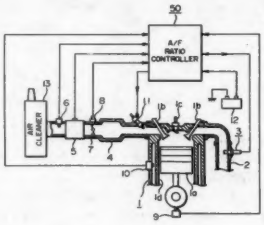
1. An electronic fuel control device adapted to activate a fuel injecting system carried on board a motor vehicle independently of a computer system carried on board the vehicle, comprising: electrical circuit means for creating an output of a series of pulses of electrical energy; electrical supply means connected to said electrical circuit means for carrying electrical power into said electrical circuit means; and pulse conducting means connected to said electrical circuit means for transporting the pulses of electrical energy from said electrical circuit means to the fuel injecting system.

4,889,098

AIR-FUEL RATIO DETECTING APPARATUS FOR AN INTERNAL COMBUSTION ENGINE EQUIPPED WITH A HEATER CONTROLLER

Hiroyoshi Suzuki, Himeji; Ryoji Nishiyama, Amagasaki, and Shinichi Nishida, Himeji, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 1, 1988, Ser. No. 278,403
Claims priority, application Japan, Dec. 1, 1987, 62-304960
Int. Cl.[4] F02M 51/00; F02D 41/14
U.S. Cl. 123—489 6 Claims



1. An air-fuel ratio detecting apparatus for an internal combustion engine comprising:

a sensing element which produces an electrical output corresponding to the concentration of a component in the exhaust gas of an internal combustion engine of a vehicle;

an electric heater which is disposed in the vicinity of said sensing element so as to be able to heat said sensing element to an activation temperature; and

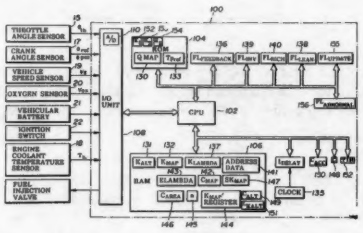
a controller for controlling the output of said heater in accordance with the operating state of the engine, a target airfuel ratio, and at least one parameter selected from the speed of the vehicle and a temperature parameter so as to maintain the temperature of said sensing element at a constant level of at least the activation temperature.

4,889,099

AIR/FUEL MIXTURE RATIO CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE WITH FEATURE OF LEARNING CORRECTION COEFFICIENT INCLUDING ALTITUDE DEPENDENT FACTOR

Naoki Tomishawa, Gunma, Japan, assignor to Japan Electronic Control Systems Company, Limited, Isezaki, Japan

Filed May 24, 1988, Ser. No. 197,843
Claims priority, application Japan, May 28, 1987, 62-129893; May 29, 1987, 62-131826; Jun. 16, 1987, 62-148035
Int. Cl.[4] F02M 51/00, 25/06; F02D 41/14
U.S. Cl. 123—489 33 Claims



1. An air/fuel ratio control system for controlling a mixture ratio of an air/fuel mixture to be introduced into a combustion chamber in an internal combustion engine, comprising:

an air/fuel mixture induction system for introducing an intake air and a fuel for forming an air/fuel mixture to be supplied into an engine combustion chamber, said air/fuel mixture delivery system incorporating a fuel metering means for delivering a controlled amount of fuel;

a first sensor means for monitoring a preselected basic first engine operation parameter to produce a first sensor signal indicative thereof;

a second sensor means for monitoring an air/fuel mixture ratio indicative parameter for producing a second sensor signal variable of the value indicative of a deviation from a threshold value representative of a stoichiometric value;

third means for deriving a basic fuel metering amount on the basis of said first sensor signal value;

fourth means for deriving a air/fuel ratio dependent correction factor variable of the value thereof depending upon said second sensor signal value;

fifth means for deriving an air density dependent first correction coefficient on the basis of said air/fuel ratio dependent correction factor for air/fuel ratio dependent correction of said basic fuel metering amount, which first correction coefficient is commonly applicable for correction of said basic fuel metering amount in over all engine driving ranges, said fifth means updating said first correction coefficient when a first learning condition is satisfied;

a sixth means for deriving a second correction coefficient which is variable depending upon the engine driving range on the basis of said air/fuel ratio dependent correction factor, said sixth means setting a plurality of said second correction coefficient in relation to respectively corresponding engine driving range and updating each of said second correction coefficient with an instantaneous value derived based on said air/fuel ratio dependent correction factor in the corresponding engine driving range;

a seventh means for detecting engine driving condition on the basis of said first sensor signal values and governing said fifth and sixth means for selectively operating one of said fifth and sixth means depending upon the detected engine driving condition; and

an eighth means for correcting said basic fuel metering amount with said correction coefficient to control said fuel metering means for delivering the fuel in the amount

corresponding to the corrected fuel metering amount to said air/fuel mixture delivery system.

4,889,100

FUEL INJECTION CONTROL SYSTEM FOR MULTI-CYLINDER INTERNAL COMBUSTION ENGINE WITH FEATURE OF IMPROVED RESPONSE CHARACTERISTICS TO ACCELERATION ENRICHMENT DEMAND

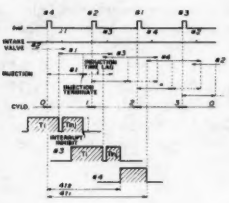
Shinpei Nakaniwa; Seiichi Otani; Toru Hamada; Masanobu Osaki; Yukio Hoshino, and Naoki Tomisawa, all of Gunma, Japan, assignors to Japan Electronic Control Systems Company, Limited, Isezaki, Japan

Filed Dec. 21, 1987, Ser. No. 135,364

Claims priority, application Japan, Dec. 19, 1986, 61-301535; Jun. 16, 1987, 62-148036; Aug. 31, 1987, 62-215189

Int. Cl.[4] F02D *41/10*

U.S. Cl. 123—492 **32 Claims**



1. A fuel injection control system for a multi-cylinder internal combustion engine including at least first and second engine cylinders, comprising:

first and second fuel injection valves corresponding to said first and second engine cylinders, each being provided for injecting fuel to the corresponding engine cylinders at respectively independent timing;

a sensor means monitoring fuel injection control parameters including an engine load and engine speed and producing fuel injection control parameter indicative sensor signal;

a detector means for detecting engine acceleration demand for producing an acceleration demand indicative signal; and

a controller unit for deriving a fuel injection amount to be injected through said first and second fuel injection valves, deriving fuel injection start timing and fuel injection terminating timing for each of said first and second fuel injection valves so that said fuel injection terminating timing is set at the beginning of induction stroke of the corresponding cylinder, and controlling said first and second fuel injection valves for performing fuel injection at controlled timing, said control unit being responsive to said acceleration demand indicative signal for deriving fuel injection amount for acceleration enrichment to perform fuel injection irrespective of engine driving stroke for one of the first and second fuel injection valves, and to delay said fuel injection terminating timing for a given period for subsequent given fuel injection timings.

4,889,101

ARRANGEMENT FOR CALCULATING THE FUEL INJECTION QUANTITY FOR AN INTERNAL COMBUSTION ENGINE

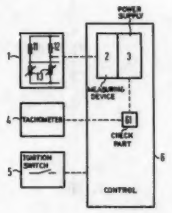
Ludwig Schifferl, Regensburg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 16, 1988, Ser. No. 244,344

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1987, 3737812

Int. Cl.[4] F02D *41/06, 41/18, 41/32*; G01F *1/68*

U.S. Cl. 123—494 **3 Claims**



1. An arrangement for calculating the fuel injection quantity for an internal combustion engine;

having an air mass meter, that has a bridge circuit having an heated sensor and an air temperature sensor in an intake train of the internal combustion engine, and that has a measuring circuit and a power supply for the bridge circuit, and that outputs an output signal dependent on the mass stream of air taken in,

having a tachometer that outputs an output signal dependent on the rpm of the internal combustion engine;

having a control device that, upon receiving the output signals of the air mass meter and of the tachometer, calculates the fuel injection quantity to be supplied to the internal combustion engine; and

having an ignition switch for switching the arrangement on and off,

comprising said control device containing a check part that disconnects the power supply of the air mass meter when the rpm of the internal combustion engine falls below a threshold which is substantially a starting rpm of the internal combustion engine.

4,889,102

ARCHERY BOW WITH SLOTTED BOW HANDLE AND ATTACHMENT RECESS

Terry G. Martin, Walla Walla, Wash., assignor to Martin Archery, Inc., Walla Walla, Wash.

Continuation-in-part of Ser. No. 211,844, Jun. 27, 1988, abandoned. This application Jul. 8, 1988, Ser. No. 216,783

Int. Cl.[4] F41B *5/00*

U.S. Cl. 124—88 **18 Claims**

1. An archery bow handle comprising:

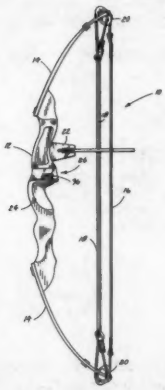
an elongated handle body of predetermined length defining a major longitudinal handle axis, the handle body having a fore edge and an aft edge which define a varying handle body width along the body length;

a hand grip extending along the major longitudinal axis;

an arrow window above the hand grip, the arrow window being defined by a generally horizontal bow shelf and a generally vertical sidewall, the arrow window having a length extending generally transverse to the major longitudinal handle axis between the fore and aft edges of the handle body, the major longitudinal handle axis bisecting the arrow window into a fore half and an aft half, the generally vertical sidewall having opposed first and second generally vertical faces, the first face facing the arrow

window, the second face facing oppositely away from the arrow window; and

an elongated slot of predetermined length extending through the generally vertical sidewall from the first face to the second face, the slot extending generally transverse to the major longitudinal axis and alongside at least a portion of



the aft window half, the slot having a minimum predetermined width sufficient to slidably receive a threaded bolt of a first arrow rest or pressure button attachment therethrough to enable selective positioning of the attachment generally transverse relative to the major longitudinal handle axis, and to a position farther aft of the bow handle than would be possible without such elongated slot.

4,889,103

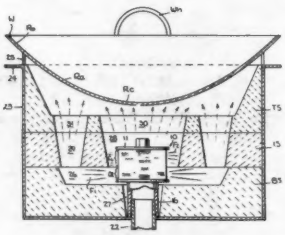
INFRARED WOK HEATER

Joseph Fraioli, 8 Seymour Pl., White Plains, N.Y. 10605

Continuation-in-part of Ser. No. 147,862, Jan. 25, 1988, Pat. No. 4,825,846. This application May 1, 1989, Ser. No. 345,406

Int. Cl.[4] F24C *3/02*

U.S. Cl. 126—92 AC **12 Claims**



1. An infrared heater for a bowl-shaped cooking wok having a central region and an annular region surrounding the central region, the heater comprising:

(a) a ribbon-type, gas-fired burner head to which a pressurized mixture of combustion air and a gaseous fuel is supplied which is expelled from the head through a cylindrical array of minute jet openings to produce, when ignited, an omnidirectional flame projected from a lower portion of the array and from an upper portion thereof;

(b) a block of refractory material which when heated to an elevated temperature by the burner head emits infrared radiation, the block having a base section provided with a circular cavity having a central zone and an outer zone; an intermediate section having a central opening communicating with the central zone of the cavity and a circular array of bores communicating with the outer zone of the cavity, and a top section having a central opening aligned with the central zone of the intermediate section and a circular array of bores aligned with the bores of the intermediate section; said burner head being placed within said block so that the flame projected from the lower portion of the cylindrical array impinges on the wall of the cavity whereby the resultant radiation is emitted through the bores in the intermediate and top sections to provide secondary infrared radiation beams, the flame projected from the upper portion of the cylindrical array impinging on the wall of the opening in the intermediate section whereby the resultant radiation is emitted through the openings in the intermediate and top sections to provide a main beam; and

(c) means to seat the wok above the block so that its central region is heated by the main beam and its annular region is heated by the secondary beams.

10. An infrared radiation heater for a cooking receptacle, the heater comprising:

(a) a gas-fired burner head to which is supplied a mixture of combustion air and a gaseous fuel which is expelled outwardly from the head through jet openings to produce, when ignited, a flame that is projected laterally from the head;

(b) a block of refractory material having a cavity therein in which said head is disposed to define a combustion chamber in which a wall of the cavity surrounds the head whereby said flame produced in said chamber impinges on the wall of the cavity to heat the block to an elevated temperature at which the block emits infrared radiation, said block having an opening therein which extends between the cavity and one end of the block to define a radiation horn from which the radiation is projected; and

(c) means to heat said receptacle above the end of the block so that the projected radiation impinges thereon to heat the receptacle.

4,889,104

AIR EXTRACTOR ARRANGEMENTS

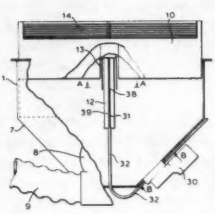
Benjamin F. Gostelow, Clwyd, Wales, assignor to New World Domestic Appliances Limited, Cheshire, England

Filed Nov. 18, 1988, Ser. No. 273,080

Claims priority, application United Kingdom, Nov. 20, 1987, 8727170; May 27, 1988, 8812704

Int. Cl.[4] F24C *15/20*

U.S. Cl. 126—299 R **9 Claims**



1. An air extractor arrangement comprising a fixed housing, an extractor fan coupled to said fixed housing, a pop-out section having an air-intake, said fixed housing and said pop-out section being telescopically disposed one within the other, a linear bearing provided between said fixed housing and said pop-out section by means of which said pop-out section is slidingly attached in said housing, a drive motor, and a worm drive cable arrangement extending between said drive motor

and said linear bearing whereby operation of said motor effects relative movement between said pop-out section and said fixed housing.

4,889,105

WATER HEATER CONSTRUCTION AND METHOD OF MANUFACTURE

Otto Z. Vago, Burns, and Ernest Wenczl, Nashville, both of Tenn., assignors to State Industries, Inc., Ashland City, Tenn.

Continuation of Ser. No. 595,388, Mar. 30, 1984, abandoned. This application Jun. 20, 1986, Ser. No. 877,701

Int. Cl.[4] F24H *1/00*

U.S. Cl. 126—361 9 Claims

1. A water heater tank assembly comprising:

a shell having a top head member and a bottom head member welded in the ends thereof, said top and bottom head members having a plurality of aligned flue tube mounting openings therein;

a plurality of metal collar members mounted in said flue tube mounting openings, each of said collar members having a cylinder flange portion and a cylindrical body portion extending therefrom, said collar members mounted in said flue tube mounting openings with said flange portions positioned against the inside surface of said top and bottom head members and with said cylindrical body portions extending through said flue tube mounting openings to a point above and below the external surface of said top and bottom head members, said collar members being welded to said top and bottom head members by a weld extending around the periphery of said flange portions on said collar members; and

a plurality of flue tubes mounted in the cylindrical body portions of said collar members with the ends of said flue tubes extending past the ends of said cylindrical body portions of said collar members, said flue tubes welded to said collar members by a weld extending around the ends of said cylindrical body portions of said collar members;

said water heater tank assembly further characterized by a glass lining fused to the interior surfaces of said tank assembly including the external surfaces of said flue tubes; and

said tank assembly further characterized wherein the longitudinal length of said cylindrical body portions of said collar members is of sufficient length so that said welds made at the ends of said cylindrical body portions will be sufficiently remote from the glass lining on the interior of said top and bottom head members so that the heat generated by said welds will not damage said glass lining.

4,889,106

TREATING INSTRUMENT FOR ENDOSCOPE

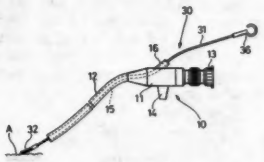
Yoshio Watanabe, Kawaguchi, Japan, assignor to Kabushiki Kaisha Machida Seisakusho, Tokyo, Japan

Filed Nov. 8, 1988, Ser. No. 268,707

Claims priority, application Japan, Nov. 13, 1987, 62-172603[U]

Int. Cl.[4] A63B *1/00*; A46B *5/00*

U.S. Cl. 128—4 6 Claims



1. A treating instrument for an endoscope, comprising:

(a) an elongated body having a forward end and a proximal end;

(b) an acting unit provided at the forward end of said body;

(c) a ring portion provided at said proximal end of said body, said ring portion being adapted to receive an operator's finger, said ring portion also being adapted to be hung on a peg to suspend the treating instrument from said peg, said ring portion being formed with a cut-out permitting said peg to pass through said cut-out, and said ring portion having a top located remotest from said proximal end of said body, said cut-out being formed at a location remote from said top of said ring portion.

4,889,107

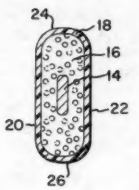
SURGICAL RETRACTOR

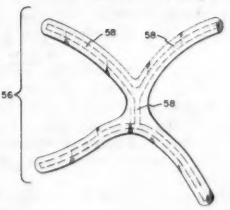
Jack W. Kaufman, 357 Frankel Blvd., Merrick, N.Y. 11566

Filed Feb. 10, 1988, Ser. No. 154,965

Int. Cl.[4] A61B *17/02*

U.S. Cl. 128—20 30 Claims





1. A surgical retractor, comprising in combination

barrier means for forming a surgical dam about an incision, said barrier means being substantially resistant to the absorption of blood and non-absorbent on its outer sur-

faces and enclosing a volume of compressible material and capable of being bent to a selected configuration in a plane perpendicular to the plane of said barrier means, said barrier means including a plurality of spaced slots in said plane of said barrier means for facilitating bends in the plane of said barrier means, and

composite core means enclosed substantially within said compressible material and bending with said barrier means to said selected configuration and for retaining said barrier means at said selected configuration, said composite core means having an H configuration and having a flexible core member made of a metal having no memory and being in the form of a shape or configuration permitting multiple barrier means during use, whereby said surgical retractor is capable of conforming to a spread apart incision wall so as to retain flesh, membrane, muscle and viscera.

4,889,108

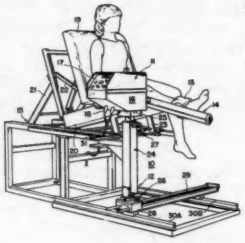
EXERCISE AND DIAGNOSTIC SYSTEM AND METHOD

Malcolm L. Bond, Winters, and Philip T. Dempster, Davis, both of Calif., assignors to Loredan Biomedical, Inc., Davis, Calif.

Continuation of Ser. No. 845,861, Mar. 28, 1986, which is a continuation-in-part of Ser. No. 568,751, Jan. 6, 1984, Pat. No. 4,601,468. This application Mar. 20, 1989, Ser. No. 325,529

Int. Cl.[4] A61H *1/02*

U.S. Cl. 128—25 R **11 Claims**



1. In a method for operating an exercise system to limit movement of a lever arm to a prearranged angular range of motion, the step of:

programming the desired range of motion of the lever arm during a programming interval, using a dedicated pair of pushbutton switches, including the steps of:

continuously measuring the angular position of the lever arm and producing an output position signal corresponding thereto;

moving said lever arm to a first angular position corresponding to a first range of motion limit position;

operating a first one of said pair of pushbutton switches to produce a first limit control signal,

storing the value of said output position signal in response to said first limit control signal as a first limit position signal;

moving said lever arm to a second angular position corresponding to a second range of motion limit position;

operating a second one of said pair pushbutton switches to produce a second limit control signal; and

storing the value of said output position signal in response to said second limit control signal as a second limit position signal;

and operating the exercise system during a subsequent exercise interval by limiting movement of said lever arm within said preprogrammed range of motion, including the steps of:

continuously measuring the angular position of said lever arm and producing an output exercising position signal corresponding thereto;

comparing the value of said output exercising position signal with said first limit position signal when said lever arm is moving toward said first range of motion limit position;

restraining further movement of said lever arm in the same direction of motion when the value of said output exercising position signal is equal to said first limit position signal;

comparing the value of said output exercising position signal with said second limit position signal when said ever arm is moving toward said second range of motion limit position; and

restraining further movement of said lever arm in the same direction of motion when the value of said output exercising position signal is equal to said second limit position signal.

4,889,109

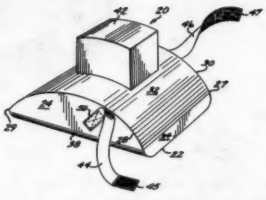
KNEE SEPARATION CUSHION

Koger B. Gifford, P.O. Box 9804, Long Beach, Calif. 90810

Filed Feb. 6, 1989, Ser. No. 306,582

Int. Cl.[4] A61F *5/00*

U.S. Cl. 128—80 A **9 Claims**



1. A leg support and knee separation cushion for fitting under the legs of a wearer to separate the knees of a wearer and maintain them elevated from a bed surface and comprising:

a pillow having a front end and a rear end and right and left side walls, said pillow being formed with a downwardly facing planar bottom surface extending from said front end to said rear end for engaging said bed surface, a top surface being curved upwardly from said front and rear ends respectively to form respective, laterally spaced apart forwardly and upwardly facing ham string support surfaces and rearwardly and upwardly facing calf support surfaces, said pillow being further formed between said respective ham string and calf support surfaces with respective peak areas for nesting behind the respective knees of such wearer;

a cushioning post defining a separation extension projecting upwardly from said pillow between said peak areas for maintaining such knees spaced apart; and

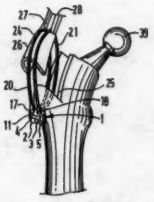
a pair of holding straps connected on their respective one ends to said respective left and right side walls of said cushion, back of said straps having a free end including fastening means for releasably connecting the free ends thereof together to secure said cushion to such legs whereby said cushion may be positioned behind the knees of such wearer lying in a supine position on such bed with said bottom surface flat against such bed surface and such knees elevated by said peak surfaces, said straps fastened to secure said cushion to such legs such that said pillow will be secured thereto in the event of rolling over of said patient to a side position to thereby maintain such knees spaced apart.

4,889,110

ATTACHING DEVICE AND TOOLS FOR POSITIONING SAME, ESPECIALLY FOR ATTACHING THE TROCHANTER MAJOR TO THE FEMUR

Yves Galline, 4 route d'Aigremont, 78240 Chambourcy, and Claude Soria, 3 rue de la Forêt, La Trigale, les Ventes, 27180 St Sebastien de Morsent, both of France

Filed Apr. 28, 1988, Ser. No. 187,085
Claims priority, application France, May 5, 1987, 87 06293
Int. Cl.[4] A61G *5/04*
U.S. Cl. 606—69 **14 Claims**



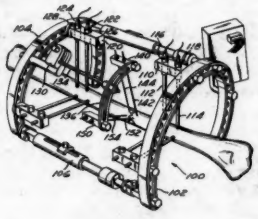
1. An attaching device especially suited for attaching the trochanter major to the femur comprising an anchoring plate having at least two bores extending through said anchoring plate, at least one crimping tube carried by said anchoring plate and positioned in one of said bores, at least one crimping ring carried by said anchoring plate and positioned in a second of said bores, and at least one multi-ply tractive cable having one end crimped in said at least one crimping tube and its other end adapted to be received in and through said at least one crimping ring.

4,889,111

BONE GROWTH STIMULATOR

Meir Ben-Dov, 69 Woodbine Rd., New City, N.Y. 10956

Continuation of Ser. No. 604,643, Apr. 2, 1984, abandoned. This application Oct. 19, 1987, Ser. No. 110,613
Int. Cl.[4] A61F *5/04*; A61N *1/32*
U.S. Cl. 128—419 F **14 Claims**



1. A bone growth stimulator comprising, in combination:

(a) a first pair of fixature pins for extending into a fractured bone, one pin on each side of the fracture site of the bone;

(b) a second pair of fixature pins for extending into the fractured bone, one pin on each side of the fracture site of the bone;

(c) means for fixing the position of said first pair and second pair of pins with the distal end thereof secured to the fractured bone to fix the position of the fractured bone or both sides of the fracture therein, and thus fixing the position of the fracture site thereof;

(d) at least one cathode comprising an electrically conductive wire externally insulated along a major central portion thereof, having a biologically compatible electrically conductive distal tip for contacting the fractured bone proximate the fracture therein;

(e) means for fixing the position of said at least one cathode with the distal tip in electrical contact with the bone proximate the fracture site therein;

(f) means electrically isolating the at least one cathode and pins from each other; and

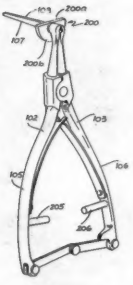
(g) means for applying electrical voltage to the at least one cathode and the pins cyclically for a plurality of time periods during each cycle, each cathode at all times having either no voltage or negative voltage applied thereto, the pins having either positive, negative or no voltage applied thereto, either the first pins or the second pins being positive when a negative voltage is applied to any cathode, the voltage application being cycled to cause electron flow from a cathode to the first pins in a first period, from the first pins to the second pins during a second period, from a cathode to the second pins in third period, and from the second pins to the first pins in fourth period.

4,889,112

APPARATUS FOR PERFORMING A TRACHEOSTOMY OPERATION

Aryeh Schachner, Givatayim, and Yoel Ovil, Ramat Hasharon, both of Israel, assignors to Waltap Ltd., Surry Hills, Australia

Filed Jun. 26, 1987, Ser. No. 67,631
Claims priority, application Israel, Jan. 23, 1987, 81378
Int. Cl.[4] A61B *17/02*; A61M *29/00*
U.S. Cl. 128—200.26 **5 Claims**



3. An instrument particularly useful in performing a tracheostomy operation of a subject, comprising:

a pair of pivotable members pivotably mounted to each other at an intermediate located thereof; each of said pivotable members including a hand grip at one end and an elongated nose at the opposite end extending laterally to its respective pivotable member;

the two elongated noses being formed at their inner confronting faces with recesses;

the outer faces of the two elongated noses being of substantially conical configuration decreasing in diameter towards their outer tips, facilitating the insertion of the noses into a trachea opening; said two elongated noses being movable apart by squeezing the hand grips towards each other to widen said trachea opening; and

a guard at the juncture of the pivotable members and their elongated noses, to prevent undue penetration underneath the skin;

said guard including two sections, each section being secured to the juncture of one of the pivotable members and its respective elongated nose;

wherein each of said guard sections is planar, of the general configuration of a quadrant of a circle, and extends substantially parallel to its respective pivotable member, such

that when the pair of pivotable members are in their closed positions, the two guard sections together define a substantially semi-circular guard with the diametrical straight edge substantially aligned with the elongated noses, and with the curved edge below the elongated noses.

4,889,113

HOOD FOR PROTECTING AGAINST SMOKE AND HYPOXIA

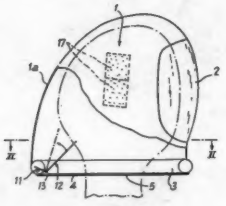
Pierre Pelloux-Gervais, Seyssins; Richard Zapata, Sassenage, and Michel Bres, Apprieu, all of France, assignors to l'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Continuation-in-part of Ser. No. 825,489, Jan. 30, 1986, abandoned. This application Apr. 20, 1987, Ser. No. 40,157

Claims priority, application France, May 31, 1985, 85 08208; PCT Int'l Appl., May 28, 1986, PCT/FR86/00179

Int. Cl.[4] A62B *7/10*

U.S. Cl. 128—201.25 **11 Claims**



1. A helmet for protecting against smoke or hypoxia, comprising inner and outer gas tight flexible covers, said inner cover being substantially transparent in a place adapted to register with a wearer's eyes, said inner cover being adapted to enclose the head of a wearer and said outer cover enclosing a portion of the exterior surface of said inner cover, said covers thus constituting a hood adapted to cover the head of the wearer, said hood having, in its lower part, sealing means adapted to connect the hood to the neck of the wearer, said helmet further including breathable gas supply means attached thereto, said portion of said inner cover and said outer gas tight flexible cover being secured together along their edges to define between them a first volume, while said inner cover and said sealing means define a second volume, said portion of said inner cover being interrupted in at least one region so as to define in this portion at least one opening through which said first and second volumes communicate with each other to allow the breathable gas to go back and forth through said opening, said covers being adaptable to move towards and away from each other according to a breathable gas demand from the wearer, making said first volume adapted to vary according to the wearer's inhalations and/or exhalations, porous filter means being placed in each of said openings for absorbing carbon dioxide and/or water from the breathable gas during its travel back and forth therethrough.

4,889,114

POWDERED PHARMACEUTICAL INHALER

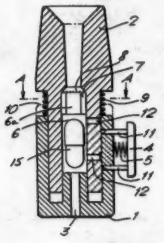
Heinrich Kladders, Ingelheim am Rhein, Fed. Rep. of Germany, assignor to Boehringer Ingelheim KG, Ingelheim am Rhein, Fed. Rep. of Germany

Continuation of Ser. No. 905,693, Sep. 9, 1986, abandoned, which is a continuation of Ser. No. 681,008, Dec. 13, 1984, abandoned. This application Jul. 2, 1987, Ser. No. 69,316

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1983, 3345722

Int. Cl.[4] A61M *15/06*

U.S. Cl. 128—203.15 **3 Claims**



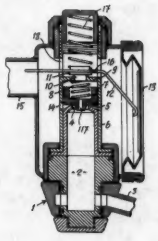
1. An inhaler for inhalation of a powdered pharmaceutical composition from a pierceable capsule having a cylindrical side wall and hemispherical ends, said inhaler comprising a mouthpiece portion having a first end adapted for connection to a user, an opposite second end and an axis extending therebetween and a base portion having a first end, an opposite second end and an axis extending therebetween, said second end of said base portion being slidably connected over the second end of said mouthpiece portion such that the portions are in coaxial alignment and are axially slidable with respect to one another from a use position to a capsule piercing position wherein the distance between the first ends of the portions is less than the distance between the first ends of the portions in the use position, said inhaler further including means for normally biasing the portions in the use position but permitting the portions to be slid to the piercing position, said portions defining, in combination, a substantially coaxial cylindrical capsule chamber for receiving the capsule having opposite ends, an internal width in the use position, which is sized to be less than the length of the capsule and an internal length, in the use position, which is sized to be about 1.02 to 2 times the length of the capsule, said base portion defining an air inlet passage terminating in one end of said capsule chamber and the mouthpiece portion defining an air outlet passage fluidically communicating with the other end of said capsule chamber, the internal cross-section of the air inlet passage being smaller than the internal cross-section of said air outlet passage which is itself smaller than the internal width of the capsule chamber, said capsule chamber being coaxially aligned with said air inlet and air outlet passages, said mouthpiece portion defining apertures extending into said capsule chamber between said opposite ends, said apertures being located to be between the first and second ends of the base portion in the piercing position and said base portion including means therein, between said first and second ends, for aligning with said apertures and piercing, via said apertures, the cylindrical side wall of the capsule when said portions are in the capsule piercing position.

4,889,115

AIR REGULATOR FOR BREATHING APPARATUS

Enrico D. Bozano, 4/f, Via N. Oderico, 16145 Genova, Italy

Filed Nov. 9, 1987, Ser. No. 117,830
Claims priority, application Italy, Nov. 12, 1986, 12570 A/86
Int. Cl.[4] A61M *16/00*
U.S. Cl. 128—204.26 5 Claims



1. An air regulator for a two-stage pressure reduction breathing apparatus for passing air from an inlet to a user's mouthpiece, wherein the second stage comprises:

first means defining a first airflow circuit to the user's mouthpiece of a size to permit a minimum required amount of breathing air to flow therethrough for allowing normal breathing by the user,

a manostat diaphragm means operatively connected to the first means for permitting said minimum required amount of air to flow through the first airflow circuit upon each act of breathing by the user with a minimum of effort exerted by the user,

second means defining a second airflow circuit to the user's mouthpiece, said second airflow circuit being in parallel with the first airflow circuit,

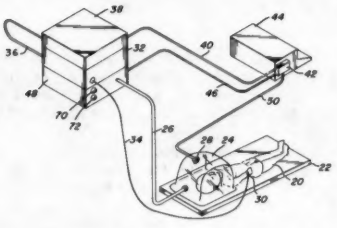
and means operatively connected to the second means to open the second airflow circuit in response to forced damping or inhalation by the user, to supply directly to the user's mouthpiece a supplementary amount of breathing air to meet any additional air needs of the user.

4,889,116

ADAPTIVE CONTROL OF NEONATAL FRACTIONAL INSPIRED OXYGEN

John C. Taube, Philadelphia, Pa., assignor to Phospho Energetics, Inc., Philadelphia, Pa.

Filed Nov. 17, 1987, Ser. No. 121,501
Int. Cl.[4] A61M *16/00*; A62B *7/00*; F16K *31/02*
U.S. Cl. 128—204.23 7 Claims



1. An adaptive controller for delivering fractional inspired oxygen to a patient, said controller comprising an oximeter adapted to be connected by an optical sensor to said patient for measuring said patient's blood hemoglobin saturation and pulse rate, said oximeter generating signals representative of said blood hemoglobin saturation and said pulse rate, calculation means responsive to said signals from said oximeter for determining the fractional inspired oxygen level to be delivered to the patient, a source of oxygen, a source of air and means connected to said source for mixing oxygen and air, said means for mixing being controlled by said calculation means and having an output adapted to be connected to the patient, said calculation means controlling the oxygen concentration that said means for mixing feeds to the patient to cause the blood in the patient to reach a predetermined hemoglobin saturation level which adapts to the patient's requirements.

4,889,117

DISPOSABLE LANCET

Peter A. Stevens, 1492 Landings Lake Dr., Sarasota, Fla. 34231

Filed Feb. 17, 1989, Ser. No. 312,951
Int. Cl.[4] A61B *17/34*
U.S. Cl. 606—181 7 Claims

1. A disposable lancet for piercing a person's finger skin sufficiently deep to let a small quantity of blood comprising:

a rigid, slender, elongated shank having a hypodermic needle-style piercing tip connected and longitudinally disposed at one end for piercing the skin;

a protective support tube having a first and second end and generally coextensive with, and surrounding said shank such that said shank is slidable longitudinally in said support tube;

a cap connected to the outer end of said shank and at least partially surrounding said first end of said protective tube such that, when said cap is pressed against said first end of said support tube by movement longitudinally in one direction, said piercing tip extends outwardly beyond said second end of said support tube a predetermined distance to an in-use position sufficient for piercing the skin;

said cap movable longitudinally in the opposite direction away from said first end of said support tube into a first stored position wherein said piercing tip is withdrawn into, and protectively concealed by, said second end of said support tube;

said cap having an inner generally cylindrical surface and a recess disposed in said inner cylindrical surface of said cap; and

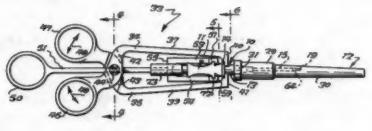
a projection on said support tube disposed within said recess such that longitudinal travel of said cap with respect to said support tube is limited by the length of said recess.

4,889,118

CATHETER-INSERTION FORCEPS

Paul E. Schwiegerling, 130 Rolling Green La., Elma, N.Y. 14059

Filed Jun. 20, 1988, Ser. No. 208,670
Int. Cl.[4] A61B *17/28*
U.S. Cl. 606—108 10 Claims



1. A forceps for inserting a catheter into a body vessel of a patient wherein said catheter is of the type having a catheter

hub and an elongated tube attached thereto and is mounted on a cannula of the type having a cannula hub with an elongated needle having a pointed tip which extends into and beyond said tube of said catheter comprising first engagement means for engaging said cannula hub, second engagement means for engaging said catheter hub, first finger-receiving means, first forceps means connecting said first finger-receiving means to said first engagement means, second finger-receiving means, second forceps means connecting said second finger-receiving means to said second engagement means, means mounting said first and second forceps means for movement relative to each other, said first and second engagement means initially occupying a position wherein said cannula and catheter ar mounted on said forceps with said pointed tip extending beyond said tube to permit said pointed tip of said cannula and said tube to be initially inserted into said body vessel, and said first and second finger-receiving means being movable relative to each other to cause said first forceps means to withdraw said cannula from said catheter after said tube has been inserted into said body vessel.

4,889,119

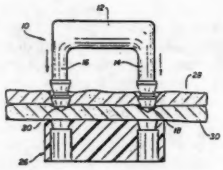
SURGICAL FASTENER MADE FROM GLYCOLIDE-RICH POLYMER BLENDS

Dennis D. Jamiolkowski, Long Valley; Mark T. Gaterud, Annandale; Hugh D. Newman, Jr., Chester, and Shalaby W. Shalaby, Lebanon, all of N.J., assignors to Ethicon, Inc., Somerville, N.J.

Continuation-in-part of Ser. No. 755,888, Jul. 17, 1985, Pat. No. 4,741,337. This application Jan. 20, 1988, Ser. No. 146,014

Int. Cl.[4] A61B *17/04*

U.S. Cl. 606—220 **12 Claims**



1. A surgical fastener comprising a blend of at least two polymers, one of said polymers, which constitutes at least 50 weight percent of said blend, being polyglycolide homopolymer or a copolymer containing at least about 90 mole percent polymerized glycolide, the other of said polymers being polylactide homopolymer or a copolymer containing at least about 50 mole percent polymerized lactide, with the overall blend containing from about 65 to about 85 percent polymerized glycolide, wherein the fastener comprising said blend is impalpable after about six to ten weeks in vivo.

4,889,120

METHOD FOR THE CONNECTION OF BIOLOGICAL STRUCTURES

Robert T. Gordon, 4936 W. Estes, Stokie, Ill. 60077

Continuation-in-part of Ser. No. 670,738, Nov. 13, 1984, abandoned. This application May 27, 1986, Ser. No. 867,023

Int. Cl.[4] A61B *17/04*

U.S. Cl. 606—216 **70 Claims**

1. A process for the connection of biological structures in living tissue by the application of external electromagnetic energy capable of the generation of heat and the alteration of biophysical properties in the edges of biological structure comprising:

introducing into the edges of the biological structures minute ferromagnetic paramagnetic, or diamagnetic particles capable of being inductively heated,

said particles being absorbed therein approximating said edges,

subjecting the edges of the biological structures to an alternating electromagnetic field to inductively heat and alter the biophysical properties of the minute particles and thereby the edges of the biological structures, and

continuing the inductive energy transfer of said particles to form the connection of the edges of the biological structures to form a unit.

4,889,121

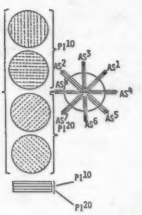
PAIN-RELIEVING COMPOSITE HAVING A RELATIVELY RAPID ACTION

Antonio Fassina, Via S. Marco, 26, Milano, Italy

Continuation-in-part of Ser. No. 817,562, Jan. 10, 1986, abandoned. This application Jan. 23, 1987, Ser. No. 6,177

Int. Cl.[4] A61N *5/06*

U.S. Cl. 128—381 **5 Claims**



1. A pain-relieving composite having a relatively rapid action for application to a body part having a longitudinal axis and a painful area, comprising at least two pairs of superposed plates of polarizing material, each pair having its plates oriented such that their polarization axes are perpendicular to each other, each bisecting line of the angles formed by the polarization axes constituting an active axis of the composite, the plates being oriented so that each plate has an active axis which is angularly offset with respect to the active axis of an adjacent plate by about 45° so as to provide at least one of the active axes in a position substantially coinciding with the longitudinal axis of the body part in which the painful area is located to provide relief to the painful area.

4,889,122

DIVERGENT ULTRASOUND ARRAYS

David Watmough, Banchory, Scotland, and Kwok K. Chan, Sheffield, United Kingdom, assignors to Aberdeen University, Scotland

Continuation of Ser. No. 936,246, Dec. 1, 1986, abandoned. This application Apr. 11, 1988, Ser. No. 180,346

Claims priority, application United Kingdom, Nov. 29, 1985, 8529446

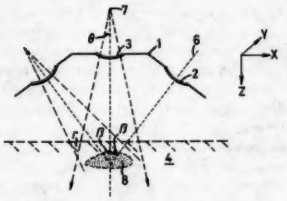
Int. Cl.[4] A61F *7/00*

U.S. Cl. 128—399 **25 Claims**

1. An ultrasound hyperthermia unit including an ultrasound transducer assembly which directs ultrasonic energy toward a target disposed at a predetermined target location with respect to said assembly,

wherein the assembly comprises a plurality of ultrasound transducers which are divergent in the near field because

of their shape and arranged radially of a central axis, and thereby provide a treatment area which includes said



target location about said central axis and adjacent said transducers in the near field.

4,889,123

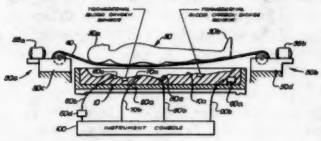
METHOD FOR DETERMINING HEART RATE

Arnold St. J. Lee, 2008 Cotner Ave., Los Angeles, Calif. 90025

Continuation of Ser. No. 73,636, Jul. 15, 1987, abandoned, which is a division of Ser. No. 786,746, Oct. 11, 1985, Pat. No. 4,681,098. This application Oct. 24, 1988, Ser. No. 262,050

Int. Cl.[4] A61B *5/04*

U.S. Cl. 128—644 **2 Claims**



1. A method for determining a subject's heart rate comprising the steps of:

placing the subject's body in a supine position in a substantially rigid body mold having an impression intimately matching the entire length of the forsal portion of the subject's body and having electrocardiogram electrodes embedded therein to produce an output voltage in response to heart activity, whereby the subject's body comes into contact with said electrodes; and

analyzing the electrode output voltage of the electrocardiogram electrodes in order to determine heart rate.

4,889,124

BIOMAGNETIC MEASURING INSTALLATION

Siegfried Schneider, Erlangen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 8, 1987, Ser. No. 130,026

Claims priority, application Fed. Rep. of Germany, Dec. 9, 1986, 3641934

Int. Cl.[4] A61B *5/05*

U.S. Cl. 128—653 **7 Claims**

1. A biomagnetic measuring installation comprising:

a foundation base having a mass in the range of from about 10 tons to about 20 tons;

a chamber having walls consisting of a plurality of spaced layers of mumetal;

means for rigidly supporting said chamber on said foundation base;

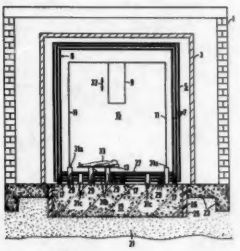
a patient support table disposed in said chamber;

a measuring cryostat disposed in said chamber;

means for supporting said measuring cryostat in said chamber above said patient support table;

a first set of posts extending through said chamber rigidly connecting said patient support table to said foundation base; and

a second set of posts extending through said chamber and rigidly connecting said means for supporting said measuring cryostat to said foundation base, said first and second sets of posts being separate so that any mechanical vibrations must be transmitted between said measuring cryostat and a patient on said patient support table through said foundation mass.



4,889,125

METHOD FOR THE DETERMINATION OF IRON STORES IN ORGANIC TISSUE AND NMR SPECTROMETER FOR PERFORMING THIS METHOD

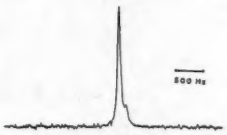
David M. Doddrell, 6 Luzerne, West Lake, Brisbane, Australia, and Michael G. Irving, 18 Henzell Terrace, Greenslopes, Brisbane, Australia (4120)

Filed Jun. 5, 1987, Ser. No. 58,954

Claims priority, application European Pat. Off., Jun. 9, 1986, 86 107 833.5

Int. Cl.[4] A61B *5/04*

U.S. Cl. 128—653 **3 Claims**



1. Method for the determination of iron stores in organic tissue, comprising measuring a nuclear magnetic resonance relaxation time of deuterium included in said tissue by magnetic resonance spectroscopy and relating the measured deuterium relaxation time to a level of iron stores for said tissue.

4,889,126

METHOD FOR DETERMINING THE TURNOVER OF ORGANIC MATERIAL IN LIVING TISSUE AND NMR SPECTROMETER FOR PERFORMING THIS METHOD

David M. Doddrell, 6 Luzerne, West Lake, Brisbane, Australia, and Michael G. Irving, 18 Henzell Terrace, Greenslopes, Brisbane, Australia (4120)

Filed Jun. 5, 1987, Ser. No. 58,302

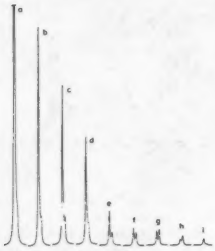
Claims priority, application European Pat. Off., Jun. 9, 1986, 86107834

Int. Cl.[4] A61B *5/04*

U.S. Cl. 128—653 **10 Claims**

1. Method for determining the rate of metabolism of an organic material in living tissue, comprising the steps of:

(a) providing a nutritious material which is appropriate to form by metabolism a component of said organic material;
(b) modifying a deuterium content of said nutritious material from a natural abundance deuterium content;
(c) feeding said modified nutritious material to said living tissue;
(d) measuring a deuterium content of said organic material by means of NMR-spectroscopy; and



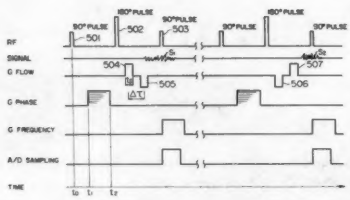
(e) evaluating a rate of metabolism of said organic material by establishing a relationship between a rate of variation of the deuterium content of said organic material as measured by means of NMR-spectroscopy and the amount in which the deuterium fed to the tissue differs from natural abundance.

4,889,127

NUCLEAR MAGNETIC RESONANCE IMAGING APPARATUS

Ryuzaburo Takeda, Mito; Hideaki Koizumi, and Yoshiyuki Miyamoto, both of Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 13, 1987, Ser. No. 37,855
Claims priority, application Japan, Apr. 11, 1986, 61-82077
Int. Cl.[4] A61B *5/05*
U.S. Cl. 128—653 **3 Claims**



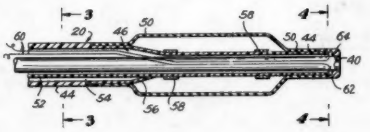
1. A nuclear magnetic resonance imaging apparatus for deriving a signal from a moving part of an object to be imaged, comprising:
gradient magnetic field coil means for generating a gradient magnetic field to be applied to the object;
gradient magnetic field power source means for supplying a current to said gradient magnetic field coil means;
radio frequency coil means for generating a radio frequency magnetic field to generate a nuclear magnetic resonance phonemenon in the object;
transmitter means for generating a radio frequency signal and for supplying the radio frequency signal to said radio frequency coil means;
receiver coil means for detecting a resonance signal produced by the object;
receiver means for amplifying and detecting the resonance signal detected by the receiver coil means and providing an output indicative thereof;
processor means for digitizing the output from the receiver means, for performing processing including image reconstruction and for providing an output for display; and
sequence controller means for controlling the gradient magnetic field power source means, the transmitter means and the receiver means at a predetermined timing so as to enable a predetermined pulse sequence, the sequence controller means controlling the transmitter means for generating and supplying the radio frequency signal to the radio frequency coil means for enabling a 180 degree RF pulse sequence so as to remove an adverse effect of non-uniformity of a static magnetic field including a first 180 degree RF pulse sequence of a first RF pulse, a 180 degree RF pulse and a second RF pulse, said sequence controller means controlling said gradient magnetic field power source means for supplying current to said gradient magnetic field coil means for generating a first pair of gradient magnetic fields having the same amplitude and opposite polarities at a predetermined time interval therebetween to the object in the direction of motion of the moving part thereof, the pair of gradient magnetic fields being applied at a timing in relation to the application of the 180 degree RF pulse by the radio frequency coil means which applies a radio frequency magnetic field to the object, the second RF pulse being applied after the 180 degree RF pulse at a time corresponding to the center of an echo signal of a resonance signal generated by the 180 degree RF pulse, the radio frequency magnetic field enabling a nuclear spin vector of the stationary part of the object in parallel to the static magnetic field, the sequence controller means enabling the receiver means to detect the resonance signal, the sequence controller means controlling the gradient magnetic field power source means, the transmitter means and the receiver means so as to provide a second 180 degree RF pulse sequence with a second pair of gradient magnetic fields having reverse polarities with respect to the first pair of gradient magnetic fields and enabling the receiver means to detect another resonance signal;
the processor means digitizing the resonance signals detected by the receiver means in accordance with the first and second 180 degree RF pulse sequence and providing a difference between the detected signals as a signal indicative of the moving part of the object.

4,889,128

DOPPLER CATHETER

Huntley D. Millar, Houston, Tex., assignor to Pfizer Hospital Products, New York, N.Y.

Continuation of Ser. No. 775,857, Sep. 15, 1985, Pat. No. 4,665,925. This application Dec. 16, 1986, Ser. No. 943,446
The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.
Int. Cl.[4] A61B *8/12*
U.S. Cl. 128—662.06 **11 Claims**



1. A steerable catheter which is operable to measure the fluid velocity in a fluid-carrying vessel, the catheter comprising:
an elongated, flexible, tubular body having a distal end and being operably manipulable in the vessel;
a channel structure operably received and generally longitudinally aligned within said body, said channel structure

defining a lumen which, with the catheter inserted into the vessel, is isolated from the fluid within the vessel;

a structure defining a passageway which, with the catheter inserted into the vessel, is adapted for operable communication with the fluid within the vessel and for receiving a wire steering guide to selectively position said distal end in the vessel; and

Doppler means for measuring the velocity of the blood through the vessel including

a Doppler crystal disposed adjacent said distal end,

the Doppler crystal having a flat face oriented generally perpendicular to the longitudinal axis of said body, said flat face defining an acoustic axis generally aligned with the longitudinal axis of said body so that the acoustic axis is manipulable into linear alignment with the fluid flow axis in the vessel, and

electrical leads connected to the crystal and disposed in said lumen in isolation from the fluid with the catheter inserted in the vessel.

4,889,129

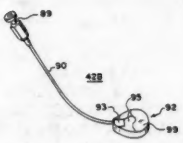
APPARATUS FOR TREATMENT OF TUMORS

Thomas J. Dougherty; William R. Potter, both of Grand Island, and Kenneth R. Weishaupt, Sloan, all of N.Y., assignors to Health Research, Inc., Buffalo, N.Y.

Continuation of Ser. No. 889,917, Jul. 24, 1986, abandoned, which is a division of Ser. No. 609,991, May 14, 1984, Pat. No. 4,649,151, which is a continuation-in-part of Ser. No. 481,345, Apr. 1, 1983, abandoned, which is a continuation-in-part of Ser. No. 424,647, Sep. 27, 1982, abandoned. This application Sep. 8, 1988, Ser. No. 243,163

Int. Cl.[4] A61B *6/00*

U.S. Cl. 128—664 **9 Claims**



1. Apparatus for transmitting radiation comprising:

a transmitting light conductor;

means for permitting radiation from a laser to enter said transmitting light conductor;

a transmitting head having internal walls defining a hollow interior sealed against fluid and coupled to said transmitting conductor;

a tubular stem surrounding at least a portion of said transmitting light conductor and being connected to said transmitting head at an angle thereto so as to permit easy insertion near an eye for the application of radiation thereto;

a first portion of said walls of said transmitting head being cup-shaped and a second portion of said walls, closing said cup;

the interior of said first portion of said walls being reflective toward said second portion of said walls;

said transmitting light conductor entering said first portion of said walls;

at least one part of said second portion of said walls being light diffusing, whereby light reflected from said first portion of said walls through said one part is diffused and transmitted from said interior;

wherein the diameter of said transmitting head is less than one-half inch.

4,889,130

METHOD FOR MONITORING A SUBJECT'S HEART AND LUNG SOUNDS

Arnold St. J. Lee, 2008 Cotner Ave., Los Angeles, Calif. 90025

Continuation of Ser. No. 73,648, Jul. 15, 1987, abandoned, which is a division of Ser. No. 786,746, Oct. 11, 1985, Pat. No. 4,681,098. This application Oct. 24, 1988, Ser. No. 262,052

Int. Cl.[4] A61B *5/02*

U.S. Cl. 128—670 **3 Claims**

1. A method for monitoring a subject's heart and lung sounds comprising the steps of:

providing a rigid body mold having an impression intimately matching the entire length of the dorsal portion of the subject's body and embedding in the mold sensor means for obtaining heart and lung sounds and producing an output corresponding to such sounds;

placing the subject in a supine position in the body mold so that the subject's heart and lung sounds can be received by the sensor means, whereby the subject's body comes into contact with said sensor means; and

checking the resulting sensor output.

4,889,131

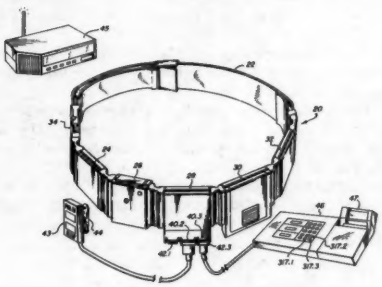
PORTABLE BELT MONITOR OF PHYSIOLOGICAL FUNCTIONS AND SENSORS THEREFOR

Robert J. Salem, New Milford, and George H. Holley, South Norwalk, both of Conn., assignors to American Health Products, Inc., Orange, Calif.

Division of Ser. No. 128,144, Dec. 3, 1987. This application Dec. 20, 1988, Ser. No. 287,883

Int. Cl.[4] A61B *5/02, 5/04, 5/08*

U.S. Cl. 128—671 **9 Claims**



1. A stretchable belt sized to fit around a body torso for sensing physiological functions, comprising:

a plurality of mechanically and electrically connected generally flat modules that are distributed so as to cover different portions of a body; selected modules being provided with means to detect EKG signals; a said module containing respiration sensor means for generating a breathing signal in response to belt tension changes attributable to breathing; a said module containing means responsive to breathing signals and EKG signals for generating heart pulse rate signals, respiration rate signals and for detecting alarm conditions associated therewith; a said module containing transmitter means to transmit detected alarm

conditions; and a said module containing a battery to electrically power said respective means; and

web means for flexibly connecting the modules to each other to form a part of the belt with sufficient articulation so that the modules can conform to a body's contour.

4,889,132

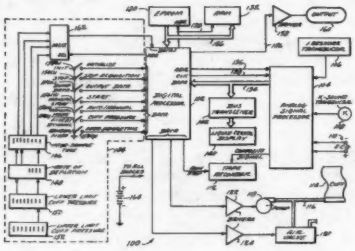
PORTABLE AUTOMATED BLOOD PRESSURE MONITORING APPARATUS AND METHOD

J. Stanford Hutcheson, Chapel Hill; Richard W. Lutz, Carrboro; Paul A. Obrist; David J. Flaugher, both of Chapel Hill, and Charles E. Watts, Raleigh, all of N.C., assignors to The University of North Carolina at Chapel Hill, Chapel Hill, N.C.

Filed Sep. 26, 1986, Ser. No. 913,677

Int. Cl.[4] A61B *5/04*

U.S. Cl. 128—680 **24 Claims**



5. A method of automatically measuring the blood pressure of a subject comprising the steps of:

(1) inflating an occluding cuff disposed on said subject to a first predetermined pressure;

(2) deflating said cuff at a controlled rate until the pressure within said cuff falls to a second predetermined pressure less than said first pressure;

(3) during said deflating step (2), sensing the pressure within said cuff;

(4) during said deflating step (2), sensing the amplitude level of sounds generated by said subject as a result of said cuff deflation;

(5) during said deflating step (2), periodically storing levels representing said sensed pressures and sensed sound amplitude levels; and

(6) after said deflating step (2), selecting, in response to said stored sensed sound amplitude levels, the stored pressure levels indicating the systolic and diastolic blood pressures of said subject, said selecting step including the steps of:

(a) determining the time of occurrence of a predetermined number of stored sound amplitude levels measured consecutively in time which have the highest mean level, said time of occurrence being the time of the center of maximum Korotkoff sound activity;

(b) determining the stored sound amplitude level measured latest in time before said time of the center of maximum Korotkoff sound activity which is less than a predetermined threshold level;

(c) selecting as the systolic blood pressure of said subject the stored pressure level measured simultaneously with said stored sound amplitude level determined by said determining step (b);

(d) determining the stored sound amplitude level measured earliest in time after said time of the center of maximum Korotkoff sound activity which is less than said predetermined threshold level; and

(e) selecting as the diastolic blood pressure of the subject the stored pressure level measured simultaneously with said stored sound amplitude level determined by said determining step (d).

4,889,133

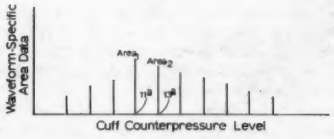
METHOD FOR NONINVASIVE BLOOD-PRESSURE MEASUREMENT BY EVALUATION OF WAVEFORM-SPECIFIC AREA DATA

Craig H. Nelson, Hillsboro; Thomas J. Dorsett, Hillsboro, and Charles L. Davis, Portland, all of Oreg., assignors to Protocol Systems, Inc., Beaverton, Oreg.

Filed May 25, 1988, Ser. No. 198,468

Int. Cl.[4] A61B *5/02*

U.S. Cl. 128—681 **20 Claims**



1. A noninvasive, oscillometric blood-pressure measurement method to determine blood-pressure parameters derived from data acquired relative to blood-pressure-induced pressure waveforms, said method enabling the acquisition of such data with improved accuracy and an improved faster rate, and said method, in operative condition relative to a blood vessel in a living subject, comprising

establishing in a means for producing a baseline counterpressure adjacent such vessel a predetermined beginning counterpressure above systolic pressure, thus to occlude the vessel,

progressively reducing counterpressure in steps from a beginning counterpressure step to a predetermined ending counterpressure step,

during said reducing, and on a step-by-step basis, monitoring the waveforms of blood-pressure-induced changes in the pressure in such means,

on the basis of said step-by-step monitoring, developing and storing waveform-specific partial-area data, and

from such stored data, calculating the desired parameters.

4,889,134

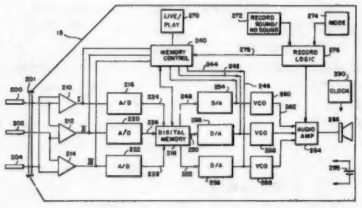
DEVICE FOR MEASURING MULTIPLE CHANNELS OF HEARTBEAT ACTIVITY AND ENCODING INTO A FORM SUITABLE FOR SIMULTANEOUS TRANSMISSION OVER

Douglas J. Greenwold, and Herbert E. Reinhold, Jr., both of Rockville, Md., assignors to Survival Technology, Inc., Bethesda, Md.

Filed Mar. 25, 1988, Ser. No. 172,924

Int. Cl.[4] A61B *5/04*

U.S. Cl. 128—696 **29 Claims**



1. A portable measuring device for acquiring, storing and transmitting electrical activity of a heart of a user comprising:

connector means for receiving signals indicative of at least two leads of electrical activity of the heart of the user;

means for amplifying said signals to produce at least first and second electrical activity signals from said signals indicative of at least two leads of electrical activity;

memory means, coupled to said amplifying means to receive said first and second electrical activity signals at an input thereof, for storing information indicative of said first and second electrical activity signals;

audio information producing means for selectively producing audio signals of a form suitable for transmission over telephone lines in response to input signals to be transmitted; and

control means for controlling operation of said device, coupled to said memory means and said audio information producing means, comprising:

(a) first means for commanding said device to operate in a live mode by connecting said at least first and second electrical activity signals which are currently being produced by said amplifying means to said audio information producing means as said input signals thereto, so that said audio information producing means produces audio signals indicative of said at least first and second electrical activity signals simultaneously for transmission over said telephone lines;

(b) second means for commanding said memory means to record said first and second electrical activity signals; and

(c) playback command means operating at least in a simultaneous mode for commanding said memory means to play back the stored information thereof in the form of input signals to said audio information producing means such that said audio information producing means produces audio signals indicative of said at least first and second electrical activity signals simultaneously for transmission over said telephone lines.

4,889,135

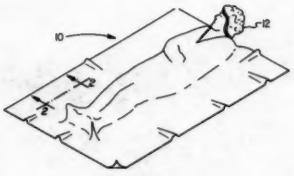
REFLECTIVE SURGICAL DRAPE

Robert J. Poettgen, Arlington, Tex., assignor to O. R. Concepts, Inc., Roanoke, Tex.

Division of Ser. No. 890,403, Jul. 25, 1986, Pat. No. 4,765,323. This application Aug. 19, 1988, Ser. No. 234,194

Int. Cl.[4] B32B *15/08, 17/00*

U.S. Cl. 128—849 **10 Claims**



1. A reflective surgical drape for covering a surgical patient and reducing heat loss from the patient's body during and after a surgical procedure, comprising:

(a) a non-conductive core layer of aluminum; and

(b) a first and second adjacent layer of a thermoplastic material.

4,889,136

SURGICAL DRAPE AND A METHOD FOR ITS MANUFACTURE

Carl-Otto Hanssen, Kullavik, Sweden, assignor to Molnlycke AB, Gothenburg, Sweden

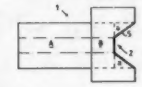
Filed May 23, 1988, Ser. No. 201,276

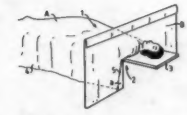
Claims priority, application Sweden, Jun. 16, 1987, 8702508

Int. Cl.[4] A61B *19/08*

U.S. Cl. 128—855 **10 Claims**

1. In a surgical drape comprising a first rectangular part (A) with two short sides and two long sides intended for covering a patient, and a second rectangular part (B) with two short sides and two long sides which is joined to the first part (A) and which is intended to be placed over an anaesthetist's arch, wherewith when the surgical drape is in use parts of the drape form substantially vertical screening walls (4) on both sides of an operating table (3), these walls extending along the sides of the first part (A) and being adapted to hang downwardly from both sides of the table to the second part (B) which is adapted to extend vertically upwards over the anaesthetist's arch; the improvement in which one short side of the first part (A) has





formed therein a cut-out (2) having opposite sides that converge in a direction away from said one short side; the second part (B) having a cut-out (2) formed in one long side thereof, the latter cut-out having opposite sides that converge in a direction away from said one long side; the first and second drape parts (A, B) being joined together along the converging sides of the cut-outs.

4,889,137

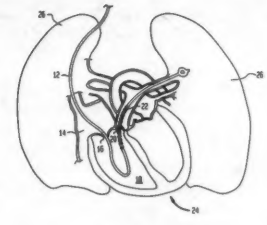
METHOD FOR IMPROVED USE OF HEART/LUNG MACHINE

Theodor Kolobow, Rockville, Md., assignor to The United States of America as reprsented by the Department of Health and Human Services, Washington, D.C.

Filed May 5, 1988, Ser. No. 190,627

Int. Cl.[4] A61B *17/00*

U.S. Cl. 128—898 **7 Claims**



1. A method of assisting cardiopulmonary bypass, comprising threading a coil through the right atrium, the right ventricle and into the pulmonary artery across the pulmonary artery valve to keep the pulmonary artery valve open during cardiopulmonary bypass.

4,889,138

METHOD OF AND APPARATUS FOR SIMULTANEOUSLY MAKING PLURAL TOBACCO STREAMS

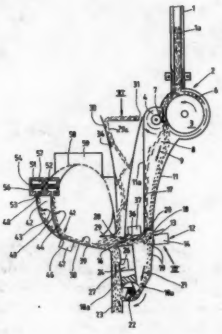
Uwe Heitmann, and Peter Brand, both of Hamburg, Fed. Rep. of Germany, assignors to Körber AG, Hamburg, Fed. Rep. of Germany

Filed Jun. 3, 1987, Ser. No. 57,783

Claims priority, application Fed. Rep. of Germany, Jun. 11, 1986, 3619579

Int. Cl.[4] A24C *5/18, 5/28*

U.S. Cl. 131—84.1 **6 Claims**



1. A method of simultaneously making a plurality of streams of fibrous material, such as tobacco, comprising the steps of building a first stream and conveying the first stream in a predetermined direction along an arcuate first path, said first stream including a first moving carpet of fibrous material which travels in said predetermined direction and has a first width; and dividing the first stream into a plurality of second streams, including diverting fibrous material of the first stream from the first path into a plurality of divergent second paths, each of said second streams including a second carpet which travels along the respective second path and has a second width, the sum of said second widths being equal to or approximating said first width.

4,889,139

METHOD OF AND MACHINE FOR MAKING A ROD-LIKE FILLER OF FIBROUS MATERIAL

Uwe Heitmann, Hamburg, Fed. Rep. of Germany, assignor to Körber AG, Hamburg, Fed. Rep. of Germany

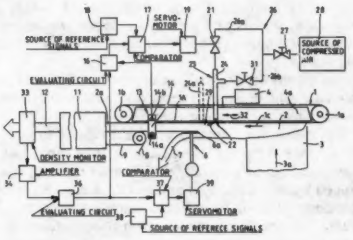
Filed May 16, 1988, Ser. No. 195,105

Claims priority, application Fed. Rep. of Germany, May 27, 1987, 3717991

Int. Cl.[4] A24C *05/39*

U.S. Cl. 131—84.3 **26 Claims**

1. A method of forming a rod of fibrous material for conversion into rod-shaped articles of the tobacco processing industry, comprising the steps of supplying fibrous material into a first portion of a predetermined path which is defined by one side of an air-permeable conveyor; applying suction to the other side of the conveyor so that the fibrous material is attracted to the one side of the conveyor and forms a stream which contains a surplus of fibrous material and advances along said path in a redetermined direction; removing the surplus from the stream in a second portion downstream of the first portion of the path so that the thus equalized stream forms a rod-like filler; and directing against successive increments of the stream at least one current of compressed air in a third portion intermediate the first and second portions of the path so that the current has a component urging successive increments of the stream away from the one side of the conveyor to thereby at least loosen the stream.



4,889,140

APPARATUS FOR MAKING PERFORATIONS IN ARTICLES OF THE TOBACCO PROCESSING INDUSTRY

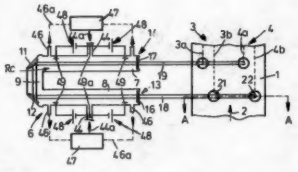
Heinz C. Lorenzen, Wentorf; Peter Pinck, Gross-Hansdorf, and Norbert Lange, Glinde, all of Fed. Rep. of Germany, assignors to Körber AG, Hamburg, Fed. Rep. of Germany

Filed Jul. 1, 1983, Ser. No. 510,400

Claims priority, application Fed. Rep. of Germany, Jul. 6, 1982, 3225183

Int. Cl.[4] A24B *7/14*

U.S. Cl. 131—281 **16 Claims**



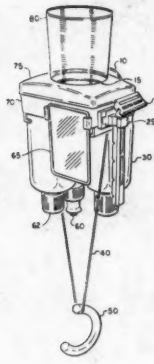
1. Apparatus for making perforations in articles of the tobacco processing industry, comprising means for transporting the articles along a predetermined path; a source of coherent radiation including a laser comprising a plurality of at least substantially parallel hollow resonators each having first and second end portions, means for mechanically coupling the first end portions of said resonators to each other so that the resonators together define a substantially U-shaped resonance chamber, a source of gas, means for admitting the gas from said source into said resonators, means for evacuating the gas from said resonators, at least one energy source, electrodes connected to said energy source and installed in said resonators, optical coupling means provided in said chamber at the first end portions of said resonators, and partially transmitting optical means provided at the second end portions of said resonators to permit a discrete active beam of coherent radiation to issue from the respective resonator; and means for focusing the active beams upon selected portions of articles in said path.

4,889,141

SHOWER TOILETRIES KIT

William J. Lindsey, 1004 East Durant, Apt. 3, Aspen, Colo. 81611

Filed Nov. 17, 1988, Ser. No. 272,767
Int. Cl.[4] B65D *71/00*
U.S. Cl. 132—286 2 Claims



1. A shower toiletries kit comprising, in combination:

a rectangular soap dish having a front, a back and two sides, a flat bottom surface and an open top, and a rectangular cover having four sides, a top surface and an open bottom, said cover being removable and fitting tightly to said soap dish forming a complete enclosure and thereby holding a bar of soap within, said cover having an aperture in said top surface, said aperture being a holding means for a drinking cup inserted therein, said soap dish having at least one drain hole in said bottom surface, inward facing "L" shaped channels attached along the full length of three edges of said bottom surface and an inverted "T" shaped channel attached at the center of said bottom surface, said "T" shaped channel being located equidistant from and parallel to two said "L" shaped channels, said soap dish having a mirror mounted on said front and a suction cup mounted on said back and a razor mounted on one side, and

at least one container for liquid shampoo or the like, comprising a bottle made of soft plastic and having a removable dispensing cap capable of being toggled between dispensing and nondispensing modes without being removed from said bottle, said bottle having grooves on each side adjacent to the base and oriented parallel to the bottom surface of said bottle, said grooves being capable of accepting said "L" shaped channels, said bottle being wide enough to fit between two parallel "L" shaped channels, and said bottom of said bottle having a slot cutout, said slot being large enough to fit over said "T" shaped channel without interference, and

a string, being attached at two opposite sides of said soap dish, said string having attached thereto a hook, the diameter of said hook exceeding the diameter of a standard shower pipe, whereby

at least one said container is inserted into said channels, said bar of soap is stored in soap said dish and said drinking cup is inserted into said aperture in said cover, and said hook is inserted over said shower pipe thus positioning said kit for use and providing a compact, convenient and easily used source of grooming aids and toiletries during and immediately after showering.

4,889,142

SMOKING ARTICLE MEANS AND METHODS OF MAKING THE SAME

Walter Rosenthal, 525 West End Ave., New York, N.Y. 10024

Continuation of Ser. No. 133,420, Dec. 15, 1987, abandoned.
This application Jun. 9, 1989, Ser. No. 366,203
Int. Cl.[4] A24B *15/28;* A24D *1/02*
U.S. Cl. 131—309 6 Claims

1. The process of preparing and using tobacco smoking products to reduce the toxicity thereof, which comprises

(a) treating the tobacco by uniformly distributing throughout the tobacco a dilute solution of potassium permanganate

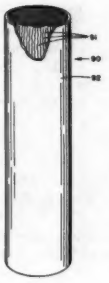
(b) during the smoking of the tobacco, causing the progressive decomposition of the potassium, with the release of nascent oxygen into the tobacco smoke stream, as a result of progressive advance through the smoking product of a layer of burning tobacco and the resulting heating of the potassium permanganate to a temperature at least approaching 240° C.

4,889,143

CIGARETTE RODS AND FILTERS CONTAINING STRANDS PROVIDED FROM SHEET-LIKE MATERIALS

James W. Pryor, Winston-Salem; Mark L. Raker, Clemmons; Andrew J. Senssabaugh, Jr., Winston-Salem, and Henry A. Hauser, Hamptonville, all of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed May 14, 1986, Ser. No. 863,222
Int. Cl.[4] A24D *1/00, 3/00*
U.S. Cl. 131—331 27 Claims



1. A filter rod for the preparation of cigarette filter elements, the rod comprising a plurality of individual strands provided from fibrous, nonwoven sheet-like reconstituted tobacco material, wherein the strands extend generally along the longitude of the rod and are contained in a circumscribing wrap, and wherein the width of each individual strand is greater than the thickness thereof.

4,889,144

FILTER FOR TOBACCO SMOKING

Atsushi Tateno, and Kimio Mashiko, both of Hiratsuka, Japan, assignors to Japan Tobacco Inc., Tokyo, Japan

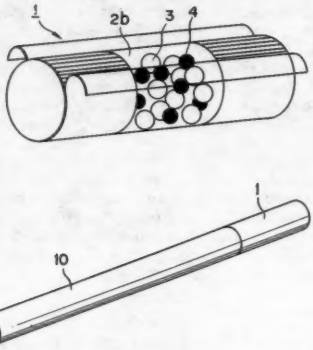
Filed May 26, 1988, Ser. No. 199,953
Claims priority, application Japan, May 29, 1987, 62-131769
Int. Cl.[4] A24F *47/00*
U.S. Cl. 131—337 6 Claims

1. A filter for tobacco smoking, comprising:

a filter tip having a space therein; and

flavor-sealed particles contained in said space in the filter tip, said flavor-sealed particles being composed of a natural polysaccharide, or its derivative, and a diluent agent selected from the group including powdered starch such as corn starch and potato starch, rice powder, calcium car-

bonate, diatomaceous earth, acetate powder, and pulp flock, and being destroyed to release the sealed flavor, by



application of a force to the outer surface of the filter which is greater than a force normally applied to the filter in a smoking action.

4,889,145

SMOKING ROD WRAPPER AND COMPOSITIONS FOR THEIR PRODUCTION

Brian Adams, Newton Abbey, and Linda Cunningham, Co. Armagh, both of Ireland, assignors to Gallagher Limited, England

PCT No. PCT/GB87/00604, § 371 Date Apr. 25, 1988, § 102(e) Date Apr. 25, 1988, PCT Pub. No. WO88/01478, PCT Pub. Date Mar. 10, 1988

PCT Filed Aug. 27, 1987, Ser. No. 187,449

Claims priority, application United Kingdom, Aug. 27, 1986, 8620698; Jul. 6, 1987, 8715849

Int. Cl.[4] A24D *1/02*

U.S. Cl. 131—365 **15 Claims**

1. A smoking rod wrapper material comprising a permeable substrate having an area containing a coating, said area containing a coating having a discontinuous coating of a porosity-reducing composition defining coated regions and uncoated regions throughout the entirely of said area, the portion of said area containing a coating occupied by said uncoated regions being between 5 and 50% of said area, and the porosity of the material in said area containing a coating (measured in coresta) being less than two thirds the porosity of said permeable substrate in the absence of the coating.

4,889,146

APPARATUS FOR COOLING A WEB

Lawrence E. Beal, Wadsworth, Ohio, assignor to Eagle-Picher Industries, Inc., Cincinnati, Ohio

Filed Nov. 23, 1988, Ser. No. 275,715

Int. Cl.[4] B08B *7/04*

U.S. Cl. 134—64 R **4 Claims**

1. Apparatus for cooling a web comprising:

two endless mesh belts,

means for establishing a spiral path for said belts wherein said belts lie side-by-side over a major portion of said path,

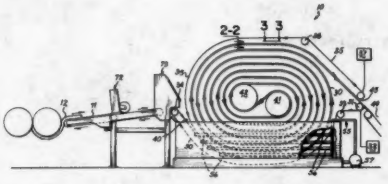
said spiral path being about a horizontal axis,

said belts, where they lie side-by-side, being spaced apart to receive said web,

means for driving said belts,

a tank,

the lower portion of said side-by-side belts passing in and out of said tank,



and means for subjecting said lower portion of said belts to a cooling liquid.

4,889,147

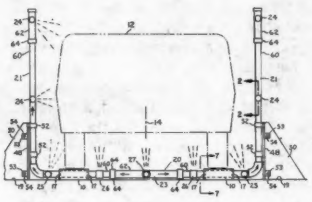
CAR WASH APPARATUS

David A. Chandler, R.D. #1 Box 292, Auburn, N.Y. 13021

Filed Oct. 5, 1988, Ser. No. 253,770

Int. Cl.[4] B60S *3/04*

U.S. Cl. 134—123 **4 Claims**



1. Portable car wash apparatus comprising two laterally-spaced wheel ramps defining a car-movement axis;

a U-shaped piping system comprising a horizontal piping section extending through both of said ramps transverse to the car-movement axis, and two upstanding piping sections extending upwardly from the ends of the horizontal piping section;

and spray nozzle means in each piping section targeted toward the zone encompassed by the piping system, whereby a car moving along the car-movement axis will have outer surface areas thereof sprayed by the nozzles;

said horizontal piping section including a centrally located water intake tube (**62**) and an outboard tube (**60**) telescopically extending into each end of the centrally located tube so that the horizontal piping section can have its located overall length adjusted without changing the position of the centrally located tube relative to the car movement axis;

said wheel ramps being located outboard from said centrally located tube to provide ramp surfaces over each outboard tube (**60**); said spray nozzle means including a spray nozzle (**26**) on each outboard tube inboard from the associated wheel ramp, and a spray nozzle (**25**) on each outboard tube outboard from the associated wheel ramp.

4,889,148

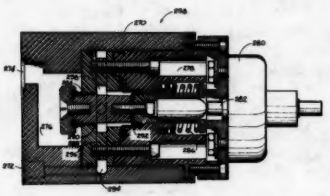
FLOW CONTROL VALVE FOR A DISPENSING SYSTEM

Kenneth G. Smazik, Marietta, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.

Continuation-in-part of Ser. No. 164,364, Mar. 4, 1988, which is a continuation-in-part of Ser. No. 137,307, Dec. 23, 1987, which is a continuation-in-part of Ser. No. 924,381, Oct. 29, 1986, abandoned. This application Sep. 1, 1988, Ser. No. 239,566

Int. Cl.[4] F16K *31/06*

U.S. Cl. 137—1 8 Claims



1. A method for controlling the flow of liquid through a solenoid valve with the smallest possible solenoid comprising:

(a) providing a valve body having a liquid passageway therethrough and including an inlet chamber and an outlet chamber with a flow control orifice therebetween including a valve seat;

(b) providing a solenoid operated needle valve movably positioned in said orifice between open and closed positions thereof for moving away from the inlet chamber and into the outlet chamber when said needle valve moves from its closed to its open position;

(c) reducing the friction of a seal between said needle valve and said valve body by providing a rolling diaphragm therebetween, said rolling diaphragm forming a wall of said inlet chamber; and

(d) reducing the net liquid force on said needle valve by providing said needle valve with a taper from a smaller to a larger diameter in the direction from said inlet chamber to said outlet chamber such that the liquid force on said needle valve in said inlet chamber created by said taper is in the direction opposite to the liquid force on said needle valve created by said rolling diaphragm; so as to balance out such forces to a desired minimum.

4,889,149

DISPENSING TOOL ASSEMBLY FOR CHARGING A REFRIGERANT OR OTHER FLUID INTO A SYSTEM

Kim A. Weaver; James M. Jones, both of Dayton, and Joseph A. Thibault, Beavercreek, all of Ohio, assignors to Production Control Units, Inc., Dayton, Ohio

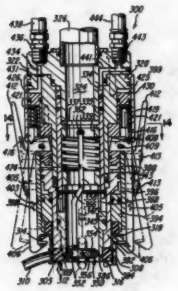
Continuation-in-part of Ser. No. 116,961, Nov. 5, 1987, Pat. No. 4,805,417. This application Feb. 21, 1989, Ser. No. 313,242

The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.

Int. Cl.[4] E03B *1/04*

U.S. Cl. 137—1 18 Claims

12. A dispensing tool assembly for connecting a liquid charging unit to a liquid receiving system having a tubular inlet fitting, said tool assembly comprising a tubular body having a center axis, means defining an axially extending liquid passage within said body, means for connecting a suction line and a liquid supply line to said passage, an annular resilient seal for forming a fluid-tight connection between said means defining said passage and the fitting, a valve member supported within said passage for movement between an open position and a closed position, a first fluid actuated annular piston supported by said body for axial movement and connected to move said valve member between said open and closed positions, coupling means supported by said body for movement between a released position and a locked position positively connecting said body to the fitting, a second fluid actuated annular piston supported by said body for axial movement and connected to move said coupling means between said locked and released positions, a third fluid actuated annular piston supported by said body and connected to press said resilient seal against the



fitting, said tubular body and said first, second and third annular pistons having a common axis, and said second piston providing for convenient coupling of said tool assembly to the fitting and for automatic release of said tool assembly from the fitting after the receiving system has received a predetermined charge of liquid.

4,889,150

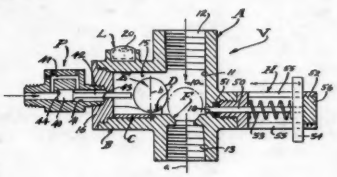
PRESSURE CONTROL FOR EARTHQUAKE SENSITIVE SHUT-OFF VALVE

Hershall E. Lloyd, and Monte E. Lloyd, both of Los Angeles, Calif., assignors to Safe-T-Quake Corporation, El Monte, Calif.

Filed May 31, 1988, Ser. No. 100,549

Int. Cl.[4] E16K *17/36, 17/22*

U.S. Cl. 137—39 6 Claims



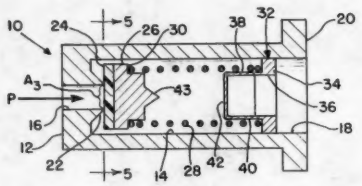
1. A normally open shut-off valve closed by increased upstream pressure in a main thereto so as to protect a downstream service line therefrom, and including; a pressure sensitive means wherein upstream pressure in the main is sensed ahead of a flow restriction in the main and downstream pressure is sensed following said flow restriction and operable to close the shut-off valve in response to upstream pressure greater than downstream pressure and comprised of a cylinder and piston means with a by-pass between the front and back of the piston and open to downstream pressure when the piston is retracted in the normal open condition of the shut-off valve, the by-pass being in open communication with upstream pressure, and the piston having a reduced diameter plunger for differential operation through a loose fitting opening exposed to pressure downstream of the shut-off valve and closed against a seat when subjected to high upstream pressure.

4,889,151

SNAP ACTION PRESSURE RELIEF VALVE WITH OVER PRESSURE INDICATOR

Peter D. Oten, 1731 Harrow Ct. No. B, Wheaton, Ill. 60187

Filed Nov. 3, 1988, Ser. No. 266,524
Int. Cl.[4] F16K *17/14, 37/00*
U.S. Cl. 137—71 **25 Claims**



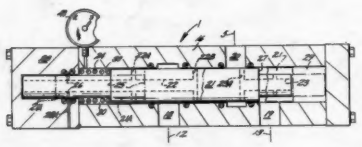
1. A pressure relief valve, comprising:
a valve body including an internal passage between an inlet and an outlet;
a valve member in said passage biased to normally close said inlet and adapted to open said inlet at a predetermined pressure in said inlet; and,
means associated with said valve member for permanently indicating that said valve member has opened said inlet including a permanently deformable element in said passage, said valve member adapted to contact and permanently deform said deformable element.

4,889,152

SYSTEM FOR AUTOMATICALLY SELECTING AND DISCHARGING A PRESSURIZED CYLINDER

Earl L. Wilson, 2163 Hayden Bridge Stub, Springfield, Oreg. 97477

Filed Jan. 30, 1989, Ser. No. 302,912
Int. Cl.[4] G05D *7/01*
U.S. Cl. 137—113 **15 Claims**



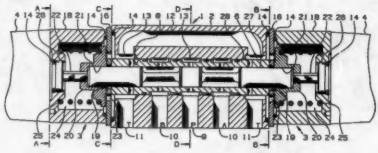
1. A system for automatically and alternately communicating pressurized sources such as gas cylinders with an outlet, said system comprising,
shut-off valves one each in communication with one of said sources, said valves each having a spool,
a switching valve including a spool, a valve body having inlet ports one each in communication with one each of said shut-off valves, an outlet port in communication with said outlet, spring means biasing said spool,
conduit means between said shut-off valves and the switching valve,
said shut-off valves each including a valve body, a spool having axial passageways, said shut-off valves each having a high pressure open position whereat gas cylinder flow is routed to said switching valve and a low pressure, closed and venting position whereat gas cylinder flow is blocked, vent means for venting said conduit means and said switching valve, means biasing the spool of each shut-off valve to said closed position upon reduced gas cylinder pressure in the shut-off valve, and
said switching valve spool having multiple axially disposed passageways one each in alternate communication with one of said spool valves, means biasing the switching valve spool in one direction.

4,889,153

COMBO FLUID VALVE

Dean E. Zepernick; Donald R. Olson, and Robert D. Scott, all of Columbiana County, Ohio, assignors to Hunt Valve Company, Salem, Ohio

Filed Feb. 24, 1987, Ser. No. 17,750
Int. Cl.[4] P16K *11/065*
U.S. Cl. 137—269 **8 Claims**



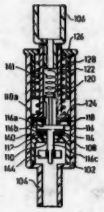
1. A fluid control valve comprising:
a valve housing adapted to accept a removable and interchangeable valve cartridge assembly of any version;
a removable and interchangeable cap assembly mechanism disposed at either end of said valve housing and comprising;
an end plate with fastening means to removable fasten said end plate to a cap having a chamber within, said end plate having a bore within adapted to slidably accept the end of said removable and interchangeable valve cartridge assembly and communicating therewith and communicating with the bore of said valve housing, and a plurality of ports of any desired configuration extending axially from said end plate and communicating with said cap chamber and an adapter disposed within said cap chamber,
said adapter disposed axially from and biased against said end plate and within said cap chamber having a bore communicating at one end with the bore of said end plate and to slidably accept the end of said removable and interchangeable valve cartridge assembly and commmunicate therewith and a bore at the opposite end adapted to accept a connecting means from a removable and interchangeable activating means and communicating therewith,
said cap with fastening and sealing means to removably fasten said cap at one end to the said end plate and comprising said cap chamber disposed to accept said adapter, said connecting means, and biasing means to bias said adapter against said end plate within said cap chamber; a bore at the opposite end of said cap with sealing means adapted to slidably accept said connecting means and cooperating with said connecting means and said activating means, and a fastening means disposed at said end of the cap to removably fasten said cap to said activating means;
said removable and interchangeable activating means disposed at the end of said removable and interchangeable cap assembly mechanism and cooperating therewith to activate said removable and interchangeable valve cartridge assembly of any version; and
said removable and interchangeable valve cartridge assembly of any version disposed within said valve housing.

4,889,154

AUTOMATIC SHUT-OFF VALVE

Peretz Rosenberg, Moshav Beit Shearim, Israel

Filed Mar. 29, 1988, Ser. No. 174,560
Claims priority, application Israel, Mar. 31, 1987, 82062; Mar. 2, 1988, 85605
Int. Cl.[4] F16K *17/04*
U.S. Cl. 137—474 17 Claims



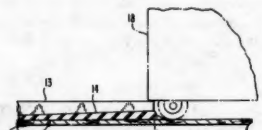
1. An automatic shut-off valve having a lower closing pressure than an opening pressure, comprising: a housing having an inlet, an outlet, and a partition formed with a valve opening connecting the inlet to the outlet; a valve member movable in the outlet side of the partition to an open or closed position with respect to said valve opening; a piston movable in the outlet side of said partition independently of said valve member and defining a chamber with said partition; said piston being formed with a passageway therethrough establishing communication between the housing outlet and said chamber; said piston including a spacer stem in its passageway and engageable with said valve member for spacing the piston from said valve member, said spacer stem being formed with a flow path axially thereof establishing communication between said chamber and the outlet of said housing; and a spring urging said piston towards the valve member and the valve member to its closed position against the force of the inlet pressure; said piston having a larger cross-sectional area than said valve member, such that the valve member opens the valve opening at a predetermined inlet pressure and closes the valve opening at a lower inlet pressure.

4,889,155

WATER COLLECTION MAT FOR DISH-WASHERS

Ansel B. Trotter, Sr., Rte. 1, Box 259, Batesburg, S.C. 29006

Filed Nov. 21, 1988, Ser. No. 274,014
Int. Cl.[4] F16K *23/00*
U.S. Cl. 137—312 7 Claims



1. A device for use with a dishwasher and the like comprising:

a base dimensioned for underlaying said dishwasher, said base having an inner surface and an opening through said base;

a rim integral with said base wherein said rim is tapered so that when bent downwardly, said rim provides a ramp for moving said dishwasher thereon;

a tube vertically disposed in said base and secured to said base at said opening,

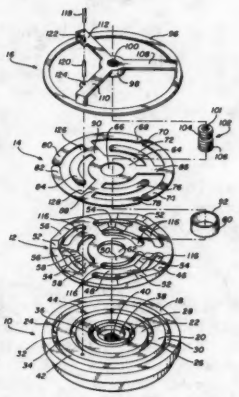
said inner surface inclined toward said opening so that liquids are directed from said inner surface through said tube.

4,889,156

COMPRESSOR VALVE WITH FLAT SPRING

Derek Woolatt, Campbell, N.Y., and George J. Safford, Quincy, Ill., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Aug. 17, 1987, Ser. No. 86,526
Int. Cl.[4] F16K *15/10*
U.S. Cl. 137—516.13 12 Claims



1. A sealing apparatus for use in a compressor suction or pressure plate valve having a seat member, with a plurality of fluid passage ports therethrough, said sealing apparatus comprising:

a. a movable plate member having a like plurality of sealing members for juxtaposed sealing engagement with said plurality of fluid passage ports in said seat member, and

b. at least one projection integrally formed on at least one of said sealing members and extending outwardly from said plate member in a direction away from said seat member for receiving a resilient flat spring member urging said plate member against and sealing said fluid passage ports.

4,889,157

CARTRIDGE VALVE ASSEMBLY

Konrad Bergmann, Wittlich, Fed. Rep. of Germany, assignor to American Standard Inc., New York, N.Y.

Filed Oct. 4, 1988, Ser. No. 253,270
Claims priority, application Austria, Oct. 8, 1987, 2659/87
Int. Cl.[4] F16K *5/04, 5/18*
U.S. Cl. 137—454.5 26 Claims

1. A top cartridge for a sanitary shut-off valve, comprising:

a head piece;

a spindle mounted to said head piece, said spindle including an axial passage extending therethrough;

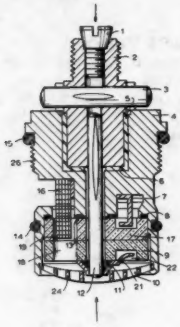
a rotatable and axially displaceable sealing disk having an axial passage and a port aperture extending therethrough;

a rotationally fixed but axially displaceable sealing disk having an axial passage and a port aperture extending therethrough;

a driver pin press fit within said axial passage extending through said spindle, said driver pin also extending through said axial passages within said rotatable and rotationally fixed sealing disks, respectively;

said spindle including no stop within said axial passage within said spindle which engages said driver pin;

a driver mounted to said driver pin near one end thereof, said driver engaging said rotatable disk;



a space defined between said driver, said pin and said rotatable disk; and

packing material filling said space.

4,889,158

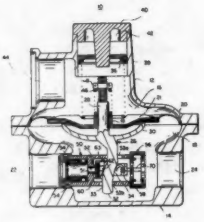
PRESSURE/FLOW COMPENSATED DIRECT ACTING PRESSURE REGULATOR

Donald D. Rice, Wylie; James C. Hawkins, and Stanley D. Hall, both of Allen, all of Tex., assignors to Fisher Controls International, Inc., Marshalltown, Iowa

Filed Aug. 26, 1988, Ser. No. 237,503

Int. Cl.[4] G05D *16/06*

U.S. Cl. 137—484.4 **17 Claims**



1. A regulator valve having an inlet and an outlet comprising:

diaphragm means;

means applying a regulating force to one side of said diaphragm means;

orifice tube means defining said inlet and providing flow communication to said outlet;

valve means in said orifice tube means operable responsive to said diaphragm means for controlling flow through said orifice tube means to said outlet;

boost means communicating with said orifice tube means for applying pressure to the other side of said diaphragm means; and

flow control means, including variable gate means in said orifice tube means upstream of said valve means, for varying the flow area of said orifice tube means as a function of the difference between pressure at said inlet and the pressure on said other side of said diaphragm means.

4,889,159

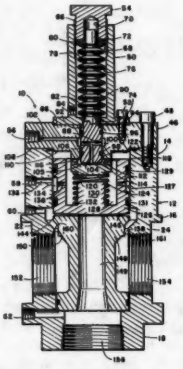
MULTIPURPOSE VALVE

Eugene P. Feild, Webb City, Mo., assignor to Laminar Fluid Controls, Inc., Webb City, Mo.

Filed Jun. 20, 1988, Ser. No. 209,497

Int. Cl.[4] F16K *31/122*

U.S. Cl. 137—508 **15 Claims**



1. A valve assembly comprising:

a housing;

a substantially cylindrical bore formed in said housing;

a substantially cylindrical, slidable valve member received within said housing bore, and having a tapered working face and a substantially planar sealing surface formed on the end received in said bore;

a bore formed in said valve member and having one end in communication with said valve member sealing surface and the other end in communication with one side of said valve member and further having a first portion thereof substantially coaxial with said valve member and a second portion thereof substantially normal to said first portion;

a valve seat mounted on said housing and having a substantially planar sealing surface directed toward said valve member sealing surface thereby defining a transversely wedge-shaped annular space between said one end of said valve member and said seat when said one end is abutted against said seat;

an annular cavity formed in said housing across from said other end of said bore with the axis of said annular cavity being substantially coaxial with said housing bore;

means for sealing between said valve member and said housing bore; and

means for biasing said valve member against said seat whereby said sealing surfaces abut one another thereby preventing flow in said valve member bore.

4,889,160

ANTITAMPER VENT ARRANGEMENT FOR A RECEPTACLE OR ENCLOSURE

Johnny S. Sheets, 1936 Old Salisbury Rd., Winston-Salem, N.C. 27127

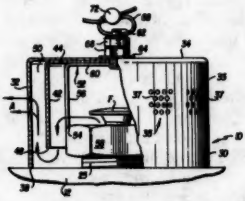
Filed Dec. 28, 1988, Ser. No. 291,167

Int. Cl.[4] F16K *24/00*

U.S. Cl. 137—588 **19 Claims**

1. A vent for a receptacle comprising a vent opening structure and inner and outer cup members, bracket means mounted to the vent opening structure for securing the inner and outer cup members to the vent opening structure, said vent opening structure comprising a tubular neck mounted to the receptacle, said bracket means comprising a vent nut for removable connection to the tubular neck and an upstanding bracket mounted

to said vent nut, each cup member comprising a tubular wall having one closed end and one open end, the inner cup member having a cross-sectional area and an end-to-end height less than the corresponding area and height of the outer cup member, said outer cup member having flow openings in the wall thereof, the inner cup member being nested in the outer cup member and the nested cup members being mounted to said upstanding bracket.



4,889,161

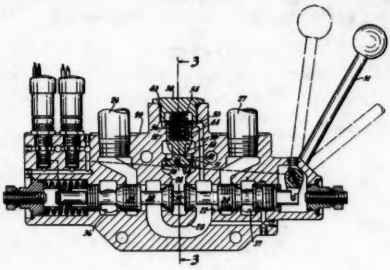
COMPENSATED INDIVIDUAL SEGMENT FLOW REGULATOR

James P. Janecke, Waukesha, Wis., assignor to Applied Power Inc., Milwaukee, Wis.

Continuation of Ser. No. 103,610, Oct. 2, 1987, abandoned. This application Sep. 6, 1988, Ser. No. 240,481

Int. Cl.[4] F15B *13/04*

U.S. Cl. 137—596 **23 Claims**



1. A flow regulating valve comprising a valve body having a supply port;

a work port designed to be coupled to a hydraulic device which creates a load pressure at said work port;

an exhaust port capable of exhausting fluid from said work port;

a horizontal bore intersecting said work and port and said exhaust port;

a vertical compartment intersecting said horizontal bore and said supply port, said vertical compartment having no more than two lands, including an upper bore land and a lower bore land, said supply port being located between said upper and lower lands in said vertical compartment;

a main spool in said horizontal bore being movable to allow a first orifice to be opened to a preselectable area between said work port and said vertical compartment, and movable to a position in which said work port communicates with said exhaust port;

a two-landed regulator spool biased downwardly by a biasing force in said vertical compartment, said regulator spool having no more than two lands, including an upper land and a lower land;

wherein said upper land of said vertical compartment and said upper land of said regulator spool form a fluid seal and bearing support that defines an upper chamber in said vertical compartment and a lower chamber in said vertical compartment, and said lower land of said regulator spool and said lower land of said vertical compartment form a second orifice of variable size, the size of said second orifice being determined by the position of said regulator spool in said vertical compartment;

a sensing passage connecting said upper chamber to said work port to allow the load pressure to be sensed in said upper chamber;

wherein when said main spool is positioned to open the first orifice to a preselected area, the load pressure is sensed in said upper chamber and pushes downwardly on the upper face of said regulator spool, a feedback pressure in said lower chamber pushing upwardly on the lower face of said regulator spool, the position of said regulator spool thereby being determined by the difference in the feedback pressure exerted on the bottom of said regulator spool and the combined pressure of said biasing force and the load pressure exerted on the top of said regulator spool.

4,889,162

FLUID CONTROL VALVE

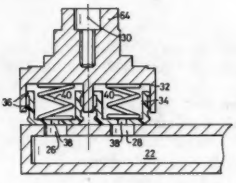
Haydn J. Newcombe, Wolverhampton, and John Hird, Shipley, both of England, assignors to Armitage Shanks Limited, Rugeley, England

Filed Sep. 2, 1988, Ser. No. 241,106

Claims priority, application United Kingdom, Sep. 9, 1987, 8721144

Int. Cl.[4] F16K *5/14, 11/22*

U.S. Cl. 137—606 **2 Claims**



1. A fluid flow control valve comprising a conduit for the fluid; a planar face formed on the conduit; a carrier member journalled for angular movement about an axis, the axis being perpendicular to and intersecting the planar face; a pair of passages opening through the planar face for flow of fluid from the conduit to the passages, the passages being equispaced about the axis; the carrier member having a pair of chambers, each chamber having a cup-shaped elastomeric valve member with a base located therein; a spring in each chamber acting on the base of the corresponding valve member to urge the same against said planar face, each cup-shaped elastomeric valve member having a plurality of peripheral sealing ribs making contact with the respective chamber around the periphery of the cup-shaped member, and each cup-shaped member base being larger than the passage and having a port therethrough which is smaller than the passage so that when the chambers and passages are axially aligned, fluid pressure acting on the inside surface of the cup-shaped member to urge the same against the planar face acts over an area larger than that subject to pressure in the opposite direction from fluid in the passage; and means for turning the carrier member to displace the cups away from the passages and allow flow therethrough.

4,889,163

VALVE ASSEMBLY

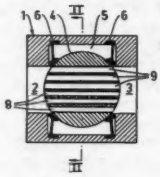
Karl-Magnus Engelbertsson, Danderyd, Sweden, assignor to AB Tore J Hedback, Danderyd, Sweden

PCT No. PCT/SE87/00054, § 371 Date Apr. 22, 1988, § 102(e) Date Apr. 22, 1988, PCT Pub. No. WO88/05880, PCT Pub. Date Aug. 11, 1988

PCT Filed Feb. 5, 1987, Ser. No. 204,428

Int. Cl.[4] F16K *47/02*

U.S. Cl. 137—625.32 7 Claims



1. A valve assembly comprising a housing having an inlet and an outlet for fluid and a spherical valve body rotatably disposed in said valve housing between said inlet and said outlet for selectively sealing and communicating said inlet and said outlet, said valve body having a plurality of first passages therethrough and a plurality of second passages therethrough, said first passages being disposed on one side of a plane in the axis of rotation of said valve body and said second passages being disposed on the other side of said plane, said second passages being larger in cross section than said first passages, there being an annular space between said valve housing and said valve body, said first and second flow passages opening in said space when said valve is fully closed and opening in said inlet and said outlet when said valve is fully opened, said first flow passages opening in said space and in said inlet and said second passages opening in said space and in said outlet when said valve is partially opened.

4,889,164

SOLENOID CONTROLLED VALVE

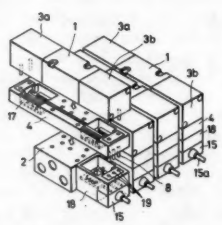
Kazuhiro Hozumi; Masaru Arai, both of Chiba, and Yoshitane Saito, Kyoto, all of Japan, assignors to Kuroda Seiko Company Limited and Nakamura Kiki Engineering Company Limited, both of, Japan

Filed Jun. 20, 1988, Ser. No. 208,771

Claims priority, application Japan, Jul. 3, 1987, 62-102883

Int. Cl.[4] F15B *13/043, 13/08*

U.S. Cl. 137—625.64 6 Claims



1. A solenoid controlled valve of a double pilot type including a valve main body having a valve mechanism installed therein and conduits connected to the valve mechanism, a pair of pilot valve units each being secured to respective sides of the valve main body, solenoids for driving the valve mechanism in the valve main body, and a base arranged underneath the valve main body and having conduits, the improvement comprising:

first and second sets of terminals each being provided on lower surfaces of the respective pilot valve units and each being connected to the respective solenoids,

a wiring box being secured to lower surfaces of the valve main body and the pilot valve units,

wherein said wiring box has a space formed therein and an electric circuitry is inserted in said space,

third and fourth sets of terminals provided on an upper surface of the wiring box at such positions that the third and fourth sets of terminals are connected to said first and second sets of terminals, respectively,

a fifth set of terminals provided on a lower surface of the wiring box,

electric wires connected between said third and fourth sets of terminals and said fifth set of terminals, and

conduits communicated with said conduits formed in said valve main body and said base.

4,889,165

WATER SUPPLY VALVES

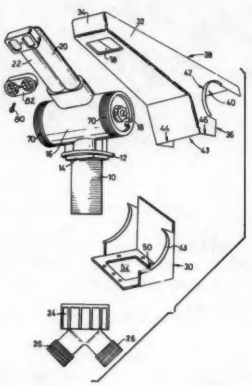
Haydn J. Newcombe, Wolverhampton, and John Hird, West Yorkshire, both of England, assignors to Armitage Shanks Limited, Armitage, England

Filed Sep. 2, 1988, Ser. No. 241,107

Claims priority, application United Kingdom, Sep. 9, 1987, 8721145

Int. Cl.[4] E03C *1/02*

U.S. Cl. 137—801 12 Claims



1. A water tap having at least one control member angularly movable about a first axis and with an elongate outlet spout extending generally along a second axis normal to the first, a shroud which comprises a first major part in the form of a closed end tube housing the spout and with a lateral outlet near the closed end, the other end of the major part being open and extending about the first axis, and a second and minor shroud part which is generally L-shaped and cooperates with the major part so that the two parts extend completely around the first axis, the parts being provided with rib portions concentric to the first axis, a ring surrounding the rib, and a cap enclosing the ring so as to hold the shroud parts together.

4,889,166

VORTEX VALVES

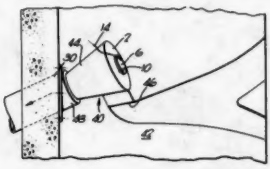
Daniel Lakatos, Scarborough, Me., assignor to Hydro International Limited, England

Filed Jan. 11, 1988, Ser. No. 141,751

Claims priority, application United Kingdom, Oct. 14, 1987, 8724143

Int. Cl.[4] F16C 1/16

U.S. Cl. 137—813 7 Claims



1. A vortex-valve comprising a housing having opposed end walls and a side wall extending between the end walls to define a vortex chamber, in which vortex chamber there is an axis of rotation between the end walls about which liquid may rotate in flowing through said housing, the housing further having an inlet in the side wall through which liquid may enter the vortex chamber in a manner to promote swirl within the vortex chamber about the axis and an outlet in one end wall of the vortex chamber, the other end wall of the housing being provided with an opening normally closed by a closure, said closure being operable by means remote from the housing between a closed position and an open position in which liquid may enter the vortex chamber by-passing said inlet.

4,889,167

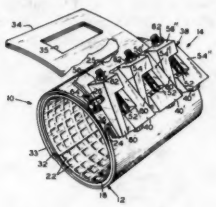
PIPE REPAIR DEVICE

Sheldon A. Morris, 27 Pamaron Way, Novato, Calif. 94949

Filed Sep. 26, 1988, Ser. No. 249,604

Int. Cl.[4] F16L 55/16

U.S. Cl. 138—99 21 Claims



1. A device for repairing leaks in a pipe or other cylindrical conduit comprising the combination of a flexible elongate band having a base end and a free end, said free end having a loop which at least partially encircles the outer diameter of a portion of the pipe and a distal portion projecting outwardly from the loop, said band comprised of an elastomeric component which yieldably compresses to form a fluid-tight seal with the underlying surface of the pipe and a tensile component which extends longitudinally with respect to the band and which has a tensile strength in an effective amount to sustain a tension force for compressing the elastomeric component to maintain said fluid-tight seal, said tensile component having a modulus of elasticity in an effective amount by which said distal portion is folded outwardly and back at an acute angle bight, and tensioning means for drawing the base end and bight of the band together to apply a tension force along the loop about the pipe and compress the elastomeric component against the underlying surface of the pipe to form said fluid-tight seal, said bight comprising said elastomeric and tensile components.

4,889,168

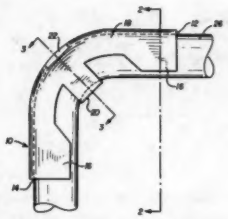
TUBING ANGLE BEND ASSEMBLY CLIP

Anthony A. Kerzich, and Douglas M. McClure, both of Cadillac, Mich., assignors to Cadillac Rubber & Plastics, Inc., Cadillac, Mich.

Filed Aug. 29, 1988, Ser. No. 238,041

Int. Cl.[4] F16L 57/00

U.S. Cl. 138—103 15 Claims



1. A tubing angle bend assembly, comprising:

a length of flexible tubing;

a clip integrally formed in one piece of a resilient plastic material mounting said length of tubing and bending said tubing through a pre-selected angle, said clip comprising:

a body of arcuate configuration and having a central portion flanked by end portions, a tangent at the end of said end portions substantially defining said pre-selected angle, said central portion forming a substantially continuous spine on an inner radial surface thereof;

resilient retaining means on said end portions extending radially inwardly defining a partial tubular passage for said tubing and for retaining said tubing in resilient fit relationship against said spine in said partial tubular passage, said retaining means having end portions defining a first access opening for resilient passage of said tubing therebetween into said tubular passage; and

a resilient central retainer flange extending radially inwardly and beneath said tubing to define a partial tubular passage for said tubing and to maintain said tubing in firm contact with said spine without collapsing said tubing, said retainer flange having an end portion defining a second access opening less than the diameter of said tubing to allow resilient passage of said tubing therethrough into said tubular passage;

whereby said tubing can be quickly mounted into said clip by passing said tubing through said first and second access openings and retained against said spine by said retaining means and said central retainer flange to smoothly bend said tubing through said pre-selected angle.

4,889,169

COMBINATION LOG DEBARKER-CHIPPER

Arnold N. Peterson, and Larry A. Sprague, both of Eugene, Oreg., assignors to Peterson Pacific Corporation, Pleasant Hill, Oreg.

Filed Feb. 21, 1989, Ser. No. 312,941

Int. Cl.[4] B27L 7/00, 1/00

U.S. Cl. 144—208 J 9 Claims

1. A mobile, combination log debarking and log chipping unit for debarking and chipping multiple logs comprising;

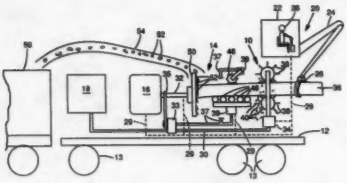
a chassis including a support frame and wheels defining a front end and rear end of the chassis,

a debarking apparatus mounted on the frame at one end of the chassis, said debarking apparatus including a debarking station having an entry and exit, and defining a path-

way into and through the debarking apparatus whereby logs can be directed from said one end of the chassis, through the entry of the debarking station to be directed out of the exit thereof and continuing along the pathway toward the other end of the chassis,

means for removing bark chips from said barking station as the log exits the debarking apparatus,

a chipping apparatus mounted on the frame at a location toward said other end relative to the debarking apparatus, said chipping apparatus including a chipping station having an entry that is aligned with and spaced from the exit of the debarking station for receiving logs therefrom, and a chip discharging chute for directing the chips produced in the chipping station away from the chassis,



conveyor means for conveying and guiding logs along said pathway through the debarking station and into the chipping station,

and a power source mounted on the frame of the chassis for providing operating power for operating the debarking station, chipping station and conveyor means.

4,889,170

HIGH STRENGTH TI ALLOY MATERIAL HAVING IMPROVED WORKABILITY AND PROCESS FOR PRODUCING THE SAME

Yoshiharu Mae, Urawa; Tsutomu Oka, Omiya, and Atsushi Hirano, Kitamoto, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 13, 1986, Ser. No. 874,099

Claims priority, application Japan, Jun. 27, 1985, 60-139067

Int. Cl.[4] C22F *1/18*; C22C *14/00*

U.S. Cl. 148—407 **4 Claims**

1. A process for producing a high strength Ti alpha-phase and beta-phase alloy material having improved workability, which comprises:

preparing a Ti alloy ingot consisting of 2–5% Al, 5–12% V and 0.5–8% Mo (the percent being on a weight basis) and which satisfies the relation: 14% $\leqq 1.5\times$(V content)+-(Mo content)$\leqq$21%, with the balance being Ti and incidental impurities;

applying final hot-working to the ingot at a temperature within the range of 600°–950° C.;

subjecting the work to solid solution treatment at a temperature in the range of 700°–800° C.; and

age-hardening the work at a temperature within the range of 300°–600° C.

4,889,171

FOLDABLE WEATHER CANOPY FOR MOTOR VEHICLES

Ruben M. Minimo, 25802 Hundson Ct., Loma Linda, Calif. 92354

Filed Jul. 22, 1987, Ser. No. 77,114

Int. Cl.[4] B60J *11/00*

U.S. Cl. 150—166 **8 Claims**

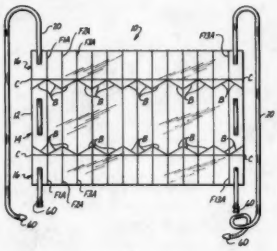
1. A protective covering for a motor vehicle comprising:

a sheet of creasable material having a longitudinal dimension between two ends;

a pair of straight parallel longitudinal creases connecting said ends and dividing said sheet longitudinally into a center and two side portions;

a plurality of transverse creases perpendicular to said parallel creases oriented in alternating directions for facilitating the folding of said sheet into an accordion stretchable in length; and

sawtooth fold means along each of said longitudinal creases enabling said side portions to be folded at a right angle to said center portion while retaining said accordion folding in a transverse direction;



whereby said sheet may be alternately formed into a protective canopy of variable length and adjustable curvature in a longitudinal direction, or folded with said side portions folded onto said center protion and all three of said portions then longitudinally collapsed in accordion fashion for storage to a compact package having a maximum dimension equal to the width of said center section, a width equal to the spacing between said transverse folds, and a height determined by the aggregate thickness of the collapsed sheet.

4,889,172

ANTI-SKID DEVICE FOR VEHICLE WHEELS

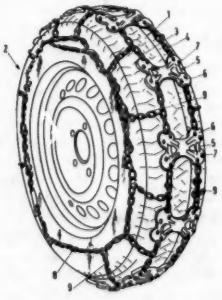
Peter Zeiser, Aalen-Wasseralfingen; Helmut Kaiser, Aalen-Hofherrnweiler, and Hansjörg Rieger, Aalen, all of Fed. Rep. of Germany, assignors to RUD-Kettenfabrik Rieger & Dietz GmbH, u. Co., Aalen, Fed. Rep. of Germany

Filed Jul. 7, 1988, Ser. No. 216,283

Claims priority, application Fed. Rep. of Germany, Jul. 8, 1987, 3722900

Int. Cl.[4] B60C *27/20*

U.S. Cl. 152—226 **28 Claims**



1. Anti-skid device for vehicle wheels having chain strand sections (3, 4) which are arranged juxtaposed in pairs and at a mutual interval considered in the direction of the wheel circumference and which come to lie in the region of the tread of the vehicle wheel in the assembled state, said device further comprising components (5,20,24) connected to the sections and

distributed round the wheel circumference, each of which exhibits a plurality of projections (6) forming anti-skid elements with surface sections facing the road when the anti-skid device is fitted, characterized in that the components (5,20,24) and their projections (6) are formed from a flexible material, particularly rubber or plastic, that at least some of the projections (6), considered in the direction of the wheel circumference, are arranged approximately aligned with parallel chain strand sections (3,4), that the outside width (b_a) of the links of the chain strand sections (3, 4) is at least approximately equal to the height (h) of the components (5,20,24) in the region of their projections (6), that the interval between the surface sections of the projections (6) and the tread of the vehicle wheel substantially equals the interval between the tread and the crest lines of the longitudinal members facing the road of vertical links of the chain strand sections (3, 4), and that the projections (6) of the components (5,20,24) are equipped with spikes (7) protruding beyond the surface sections of the projections (6).

4,889,173

TIRE REINFORCING COMPONENT

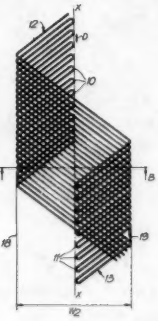
Derek Mathews, St. Helens, United Kingdom, assignor to Apsley Metals Limited, United Kingdom

Filed Dec. 3, 1987, Ser. No. 128,159

Claims priority, application United Kingdom, Dec. 3, 1986, 8628976

Int. Cl.[4] B60C 9/26

U.S. Cl. 152—528 **8 Claims**



1. A tire reinforcing component formed from a ply having a pair of edges and a longitudinal centerline, the ply comprising elastomeric material reinforced by a single continuous cord which extends back and forth from edge to edge across the width of the ply in a zig-zag formation in which the portions of the cord traversing the play are substantially parallel to each other and the edges of the ply are formed with a plurality of loops, the edge margins of the ply being folded inwards back onto the ply so that the looped edges lie adjacent the longitudinal centerline of the ply, and the axially inner edge of at least one of said edge margins being displaced longitudinally relative to said centerline of the ply so that the bias angle made by the traversing cords relative to said centerline is different for those traversing cords in said one folded edge margin, than for the bias angle of those cords in other portions of the ply.

4,889,174

PNEUMATIC RADIAL TIRES

Kazuo Oshima, Higashiyamato, and Shizuo Iwasaki, Kodaira, both of Japan, assignors to Bridgestone Corp., Tokyo, Japan

Filed Nov. 5, 1986, Ser. No. 927,016

Claims priority, application Japan, Nov. 5, 1985, 60-246317; Jun. 13, 1986, 61-136285

Int. Cl.[4] B60C 09/26

U.S. Cl. 152—529 **4 Claims**

1. A pneumatic radial tire comprising; a tread portion, a carcass ply and a belt composed of a first belt layer superimposed on the carcass ply and made of steel cords, a second belt layer piled on the first belt layer and made of cords obtained by twisting polyvinyl alcohol fibers each having an elongation of not more than 2% under a stress of 4.5 g/d and a strength of not less than 15.0 g/d, and a third belt layer made of cords obtained by twisting polyvinyl alcohol fibers each having an elongation of not more than 2% under a stress of 4.5 g/d and a strength of not less than 15.0 g/d, said third belt layer housed in said second belt layer by said second belt folded radially inward back at both ends portions.

4,889,175

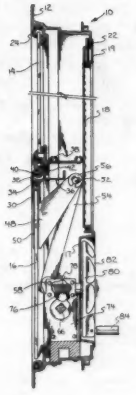
TORQUE WINDOW

Robert A. Frey, Elkhart, Ind.; Gail E. Woods, Sturgis, Mich., and Leroy C. Schmuck, Kendallville, Ind., assignors to Excel Industries, Inc., Elkhart, Ind.

Filed Mar. 22, 1988, Ser. No. 171,825

Int. Cl.[4] E06B 3/32

U.S. Cl. 160—90 **7 Claims**



1. In a vehicle window assembly including a peripheral frame which defines an opening, first and second window glazing panels carried by and supported in said frame and spanning said opening, said first glazing panel fixedly secured to said frame, said second glazing panel including peripheral side edges and pivotally secured to said frame for movement between a closed position adjacent said frame, and an open position with one edge spaced from said frame, and crank means for pivoting said second glazing panel between its open and closed positions, the improvement wherein said frame includes horizontal and vertical frame members, said crank means includes a hand crank positioned adjacent one of said horizontal members generally equidistantly spaced from said

vertical frame members, link means connected between said hand crank and said second glazing panel peripheral side edges responsive to movement of said hand crank for pivoting the second glazing panel between its open and closed positions.

4,889,176

DEVICE IN ROLL-UP DOORS

Ulf C. Nilsson, Halmstad, Sweden, assignor to Nomafa AB, Gamletullsgatan, Sweden

PCT No. PCT/SE87/00185, § 371 Date Sep. 16, 1988, § 102(e) Date Sep. 16, 1988, PCT Pub. No. WO87/06299, PCT Pub. Date Oct. 22, 1987

PCT Filed Apr. 13, 1987, Ser. No. 249,571

Claims priority, application Sweden, Apr. 17, 1986, 8601757

Int. Cl.[4] A47G *5/02*

U.S. Cl. 160—264 **7 Claims**

1. A device in roll-up doors of the kind comprising at least one flexible door leaf (2) which is arranged to be wound onto a roller (1), said device comprising at least one reinforcement element (3, 4, 5) which extends crosswise relatively to the door leaf, characterized therein that the reinforcement element or elements (3, 4, 5) are not connected to said door leaf (2) and are provided with end pieces (9) which are arranged to cooperate dimensionally with abutments (11, 12) provided in profiled guiding members (10) located in the door frame for the purpose of setting said reinforcement elements (3, 4, 5) at different predetermined levels, said profiled guiding members having reinforcement element receiving openings for passage therethrough of respective reinforcement elements, and further that the cross-sectional dimension of the end pieces (9) at the ends of the reinforcement elements (3, 4, 5) exceeds the cross-sectional dimension of each respective guiding member at its respective abutment (11, 12) establishing cooperation between said reinforcement elements and said abutments (11, 12) and further that the cross-sectional dimension of said end pieces (9) at the ends of the reinforcement elements (3, 4, 5) exceeds the cross-sectional dimension of said reinforcement element receiving openings.

4,889,177

METHOD AND APPARATUS FOR SAND MOULDING COMPOSITE ARTICLES WITH A DIE MADE OF LIGHT ALLOY AND A FIBROUS INSERT

Jean Charbonnier, Voreppe, and Francois Gollard, Le Grand Lemps, both of France, assignors to Cegedur Societe de Transformation de L'Aluminium Pechiney, Paris, France

Filed Jun. 7, 1988, Ser. No. 203,074

Claims priority, application France, Jun. 11, 1987, 87 08749

Int. Cl.[4] B22D *19/02*

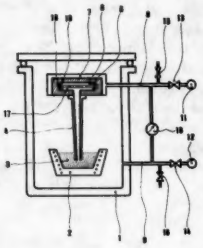
U.S. Cl. 164—97 **5 Claims**

1. A method of casting composites of a light alloy metal with a fibrous insert, comprising:

(a) providing a furnace containing molten metal bath, a sand mold having walls forming a mold cavity and a fibrous perform in the mold cavity separate from the walls and a tube connecting the mold cavity and molten metal in the furnace;

(b) reducing the pressure in the mold cavity and above the bath;

(c) increasing the pressure above the bath to create a positive pressure differential ΔP relative to the mold cavity and



thereby force molten metal from the bath into the mold cavity;

(d) simultaneously increasing the pressure to above atmospheric pressure in the mold cavity and above the bath; and

(e) maintaining the differential ΔP until the metal in he mold cavity solidifies.

4,889,178

WITHDRAWAL AND DISCHARGE DEVICE FOR A VERTICAL CONTINUOUS CASTING MACHINE

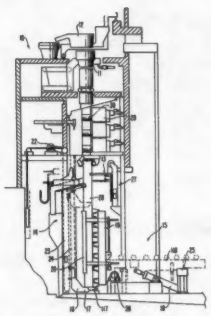
Giovanni Nigris, Mereto di Tomba, and Roberto Manera, Udine, both of Italy, assignors to Danieli & C. Officine Meccaniche SpA, Buttrio, Italy

Filed Jul. 5, 1988, Ser. No. 214,956

Claims priority, application Italy, Jul. 30, 1987, 83419 A/87

Int. Cl.[4] B22D *11/126, 11/128*

U.S. Cl. 164—448 **7 Claims**



1. A withdrawal and discharge device for a vertical continuous casting machine that produces blooms from an ingot mold of a weight ranging from one to at least twenty units of weight and of varying lengths, said device comprising:

a plurality of withdrawal roll assemblies located downstream of said ingot mold, said roll assemblies each having at least a pair of rolls, and at least one of said roll assemblies operating at any given time;

a support frame supporting said blooms of varying weight and length said support frame being located downstream of said roll assemblies; a support assembly driven by a motor assembly for movement with respect to said sup-

port frame, said support assembly having a support carriage and a foot, the speed of said support carriage or foot ranging from one to at least fifty units of speed; and

individual hydraulic circuits operably coupled to a corresponding one of said roll assemblies and said motor assembly to provide drive and control thereof.

4,889,179

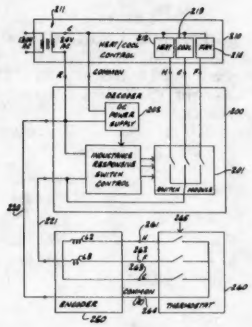
TWO WIRE ADAPTIVE SYSTEM FOR INTERCONNECTING A FOUR WIRE THERMOSTAT AND A FOUR WIRE, HEATING/COOLING SYSTEM

Joseph T. Merenda, Northport, N.Y., assignor to J. R. Microwave, Inc., Northport, N.Y.

Filed Nov. 25, 1987, Ser. No. 125,167

Int. Cl.[4] F25B *29/00;* **G05D** *23/00, 23/30*

U.S. Cl. 165—14 **11 Claims**



1. An apparatus for use in combination with a control thermostat having first, second, third and fourth control ports which are associated with first, second, third and fourth system ports of a heating/cooling system responsive to the control, said apparatus comprising:

first means for encoding signals provided by the control thermostat, said first means having first, second, third and fourth encoding input ports connected to the first, second, third and fourth control thermostat ports, respectively, and said first means having only first and second encoded ports;

second means for decoding signals provided by the first means, said second means having only first and second decoding ports and having first, second, third and fourth decoded output ports connected to the first, second, third and fourth heating/cooling system ports, respectively;

third means for interconnecting the first and second encoded ports to the first and second decoding ports, respectively; and

fourth means for supplying power to said second means.

4,889,180

SYSTEM FOR USE IN PROVIDING COMPRESSED AIR FOR SNOW MAKING EQUIPMENT

Mark D. Sloan, Harris County, Tex., assignor to Brunner Engineering & Manufacturing Inc., Houston, Tex.

Filed Apr. 14, 1989, Ser. No. 338,189

Int. Cl.[4] F25B *29/00;* **A01G** *15/00;* **E01H** *13/00*

U.S. Cl. 165—30 **3 Claims**

1. A system for use in providing compressed air for snow making equipment, the system being used in conjunction with a liquid cooled air compressor, the air compressor having a cooling liquid inlet and a cooling liquid outlet and having a compressed air discharge outlet, the system comprising:

a superstructure supported on the earth's surface;

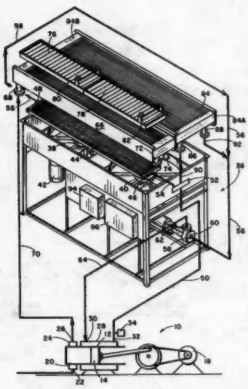
a plurality of motor driven fans supported by the superstructure, the fans being in line and in a common plane, and providing an air flow path for each fan;

a heater coil assembly positioned adjacent said fans whereby air moved by said fans passes therethrough, the assembly having a cooling liquid inlet and a cooling liquid outlet;

an air-to-air heat exchanger positioned adjacent said heater coil assembly and in said air flow paths of said fans whereby air moved by said fans may pass therethrough, the air-to-air heat exchanger having an air inlet connected to receive compressed air from an air compressor and an air outlet connected to snow making equipment;

an actuator controlled louver positioned adjacent said air-to-air heat exchanger for each fan and in the path of air moved through said heater coil assembly;

a liquid cooling coil assembly supported by said superstructure and positioned adjacent said air-to-air heat exchanger



above said fans and in a separate air flow path and having a liquid inlet and a liquid outlet;

a liquid transfer pump having an inlet and an outlet, the outlet being connected to an air compressor cooling liquid inlet;

means of conveying a selectable portion of the cooling liquid from the air compressor cooling liquid outlet to said heater coil assembly and of conveying a selectable portion of the cooling liquid from said air compressor cooling liquid outlet to said liquid cooling coil assembly inlet, the portion conducted to said heater coil assembly being determined by the air temperature at the outlet of said air-to-air heat exchanger; and

means to regulate said actuator controlled louvers in response to the temperature of air at the outlet of said air-to-air heat exchanger.

4,889,181

HEAT EXCHANGER AND SHEET MATERIAL THEREFOR

Sjoerd Meijer, No. 894, Oude Bildtdijk, NL 9097 NG St. Jacobiparochie, Netherlands

Filed Oct. 28, 1988, Ser. No. 263,879

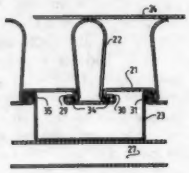
Claims priority, application Netherlands, Oct. 30, 1987, 8702600

Int. Cl.[4] F28F *13/14, 1/08, 1/20*

U.S. Cl. 165—78 **16 Claims**

1. Heat exchanger comprising at least two circulation spaces for heat-exchanging media, separated from each other by a heat-transmitting bulkhead which supports a plurality of surface-area enlarging members on at least one side, characterized in that said bulkhead has a preformed profile in cross-section with alternatingly opposing S-shaped creases spaced at inter-

vals, and that said surface-area enlarging members are separate profile members each of which is provided with lips at the



opposite edges thereof which are received in two mutually facing sideways-recessed grooves which are defined by opposing S-creases.

4,889,182

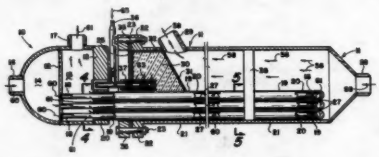
HEAT EXCHANGER

Peter H. Kösters, Magrette 1a, Netherlands, assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 405,213, Aug. 4, 1982, abandoned. This application Mar. 15, 1985, Ser. No. 711,927

Int. Cl.[4] F28F *19/00, 13/00;* F28D *7/12*

U.S. Cl. 165—134.1 **3 Claims**



1. A heat exchanger for cooling a first fluid, at a given temperature and pressure, with a second fluid, at a lower temperature and higher pressure, the heat exchanger comprising:

a head section which includes an inlet and an outlet for the lower temperature fluid;

a heat exchanging section which includes a bundle of inner conduits, each inner conduit is open at both ends, each inner conduit extends from the head section to the heat exchanging section, and each inner conduit is in fluid communication with the inlet for the second fluid, which is the lower temperature fluid, such that the lower temperature fluid can pass through each of the inner conduits;

the heat exchanging section further includes a bundle of outer conduits, each outer conduit is in fluid communication with the outlet for the lower temperature fluid, each outer conduit encloses that part of each inner conduit which lies within the heat exchanging section, such that a channel is defined between the inner surface of the outer conduit and the outer surface of the inner conduit, and the channel provides means for the lower temperature fluid, as it exits from the inner conduits, to flow to the outlet in the head section;

the heat exchanging section further includes an inlet and an outlet for the first fluid, which is the higher temperature fluid, and the heat exchanging section has a space defined therein for the higher temperature fluid to pass from the inlet to the outlet, such that the higher temperature fluid contacts the conduits containing the lower temperature fluid;

the heat exchanger has a temperature adjustment zone defined by an insulation packet, the packet is positioned between the head section and heat exchanging section and enclosed by a closure member and an impingement plate, the closure member is adjacent to a cooling fluid chamber, and the impingement plate is in contact with the higher temperature fluid in the heat exchanging section; and

the inner and outer conduits pass through the cooling fluid chamber, the closure member, and the impingement plate, passages are defined between the outer conduits and the closure member, and between the outer conduits and the impingement plate, and the passages provide fluid communication between the cooling fluid chamber and the insulation packet.

4,889,183

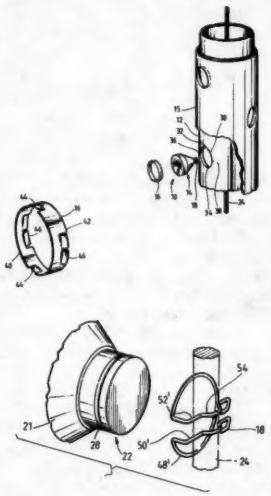
METHOD AND APPARATUS FOR RETAINING SHAPED CHARGES

Kenneth C. Sommers; David S. Wesson, both of Katy, and Kevin R. George, Columbus, all of Tex., assignors to Halliburton Services, Duncan, Okla.

Filed Jul. 14, 1988, Ser. No. 218,998

Int. Cl.[4] E21B *43/117*

U.S. Cl. 166—55 **12 Claims**



1. Apparatus for mounting a shaped charge in a carrier, such shaped charge having a detonation end and a primer end, comprising:

a band clip mounted on said shaped charge and having a first side proximate said detonation end of said shaped and a second opposite said first side;

said band clip including

a first radially outwardly biased tab adapted to cooperate with said carrier to retain said shaped charge in said carrier and prevent movement of said shaped charge relative to said carrier in a first direction when said shaped charge is mounted in said carrier; and

a second radially outwardly biased tab oppositely oriented adapted to cooperate with said carrier to retain said shaped charge in said carrier and prevent movement of said shaped charge relative to said carrier in a second direction when said shaped charge is mounted in said carrier.

4,889,184

POLISHED ROD STUFFING BOX WITH SAFETY VALVE FOR A BEAM PUMPED PRODUCTION WELL

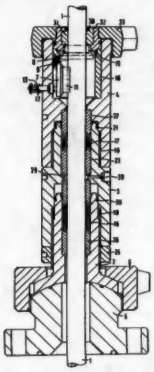
Lubbertus Lugtmeier, and Albert Klamer, both of Abel Tasmanplein, Netherlands, assignors to Shell Internationale Research, The Hague, Netherlands

Filed May 16, 1988, Ser. No. 194,607

Claims priority, application United Kingdom, May 27, 1987, 8712456

Int. Cl.[4] E21B *33/03*

U.S. Cl. 166—80 7 Claims



1. A wellhead assembly for a beam pump assembly of a beam pumped production well, the assembly comprising

a stuffing box for providing a seal around a polished rod of the beam pump assembly, said stuffing box comprising first, second and third tubular elements, which elements are co-axially arranged around the polished rod, said first element being mounted on top of a ball coupling, said second element at least partly surrounding and being screwed on top of said first tubular element and said third element at least partly surrounding and being screwed on top of said second element and said third tubular element carries a safety valve;

said safety valve comprising a flapper type valve body which is hingeably secured to the stuffing box in such a manner that in use a wear plate carried by the valve body is pressed against the polished rod;

means for monitoring the amount of wear of the wear plate on the basis of the angular orientation of the valve body relative to the stuffing box; and

back-up seal rings between said first and second tubular elements and between said second and third tubular elements defining an annular space in which said back-up seal rings are arranged.

4,889,185

BLAST JOINT

Robert J. Uherek, Sr., 2804 S.E. Dunes Dr. 1309, Stuart, Fla. 34996, and Jack R. Claycomb, 8226 Waynemer, Houston, Tex. 77040

Filed Nov. 17, 1987, Ser. No. 121,907

Int. Cl.[4] E21B *17/10*; F16L *55/00*

U.S. Cl. 166—243 12 Claims

1. A blast joint, comprising:

(a) at least two tubular members having threaded opposed ends;

(b) a plurality of erosion resistant rings encasing said tubular members;

(c) support means for supporting said erosion resistant rings about said tubular members;

(d) coupling shield means supported on at least one of said tubular members in telescoping relation about said erosion resistant rings;

(e) at least one tubular open ended slip sleeve mounted about said erosion resistant rings on said tubular members for

providing a surface for engagement by pipe slips for suspending said tubular members in a well bore; and

(f) connector means for connecting said tubular members to form said blast joint.

4,889,186

OVERLAPPING HORIZONTAL FRACTURE FORMATION AND FLOODING PROCESS

Merle E. Hanson, Livermore, and Lewis D. Thorson, Milpitas, both of Calif., assignors to Comdisco Resources, Inc., San Francisco, Calif.

Filed Apr. 25, 1988, Ser. No. 186,046

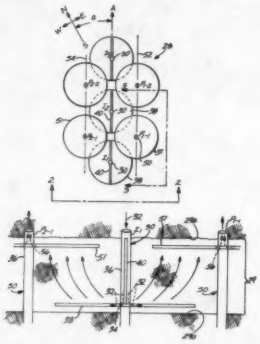
Int. Cl.[4] E21B *43/26*, *43/30*

U.S. Cl. 166—252 36 Claims

1. In a fluid flood process for enhancing the secondary recovery of hydrocarbons from a reservoir involving at least one pair of respective fluid injection and hydrocarbon recovery wells, having well bores, including the steps of (i) establishing a horizontal injection fracture for each injection well, said injection fracture extending substantially horizontally from said injection well bore proximate a lower portion of said reservoir and; (ii) establishing a horizontal recovery fracture

for each recovery well, said recovery fracture extending substantially horizontally from said recovery well bore and the recovery fracture being vertically displaced from and above said injection fracture in the hydrocarbon reservoir, the improvement comprising the steps of:

determining the azimuth of a vertical component of a fracture for said reservoir structure during the formulation of at least one of said fractures;



disposing said injection wells and said recovery wells along lines substantially parallel to said azimuth of said vertical component;

sizing the horizontal extent of said respective injection and recovery fractures to maximize overlap in the reservoir therebetween; and

offsetting such injection and recovery wells to avoid a direct vertical path for the fluid flood between such respective injection and recovery fractures.

4,889,187

MULTI-RUN CHEMICAL CUTTER AND METHOD

Jamie B. Terrell; Donna P. Terrell, 1916 Christopher Dr., Forth Worth, Tex. 76140, and Setella Parks, Longview, Tex., assignors to Jamie Bryant Terrell and Donna Pratt Terrell, both of Forth Worth, Tex.

Filed Apr. 25, 1988, Ser. No. 185,877

Int. Cl.[4] E21B *29/02*

U.S. Cl. 166—298 **21 Claims**

1. A method of cutting a tubular member comprising the steps of:

running a first cutting head into said tubular member to a selected axial position;

discharging a first quantity of cutting fluid from said first cutting head;

withdrawing said first cutting head from said tubular member running a second cutting head into said tubular member to said axial position of the tubular member cut by the discharge of said first quantity of cutting fluid;

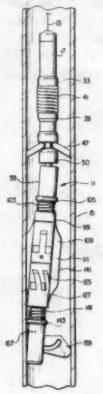
rotating said second cutting head; and discharging a second quantity of cutting fluid from said second cutting head onto a portion of said tubular member other than the position onto which said first quantity of cutting fluid was discharged.

12. Apparatus for cutting a tubular member comprising:

a cutting head adapted to be inserted in said tubular member, said cutting head including at least one nozzle;

means for orienting said at least one nozzle circumferentially with respect to a previously cut sector of said tubular member, said orienting means including means for rotating said cutting head within said tubular member and means for locating said previously cut sector;

decentralizer means for positioning said at least one nozzle radially adjacent a portion of said tubular member; and



means for discharging a quantity of cutting fluid from said at least one nozzle to cut said portion of said tubular member other than said previously cut sector.

4,889,188

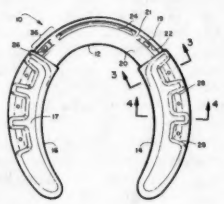
HORSESHOE

Willard H. Anderson, 849 Beryl St., San Diego, Calif. 92109

Filed Jun. 16, 1988, Ser. No. 207,209

Int. Cl.[4] A01L *5/00, 7/02*

U.S. Cl. 168—13 **10 Claims**



1. A horseshoe formed of a predetermined metallic material comprising:

a central arcuate portion, an arcuate right leg portion, and an arcuate left leg portion;

said horseshoe having a flat top surface that attaches to the bottom surface of a horse's hoof and a bottom surface for walking on;

said bottom surface of said arcuate leg portions having an inner concave portion, an outer convex portion and a ridge portion therebetween, a groove extends along a major portion of the ridge portion of said arcuate right and left leg portions;

a plurality of nail hole apertures are formed in said arcuate right leg portion and in said arcuate left leg portion and said nail hole apertures have their bottom ends in communication with said groove; and

a predetermined thickness of non-metallic shock absorbing material attached to the bottom surface of said horseshoe and a portion thereof has flowed into said groove to form plugs that aid in attaching said shock absorbing material to the bottom surface of said metallic horseshoe.

4,889,189

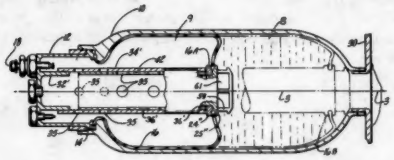
FIRE SUPPRESSANT MECHANISM AND METHOD FOR SIZING SAME

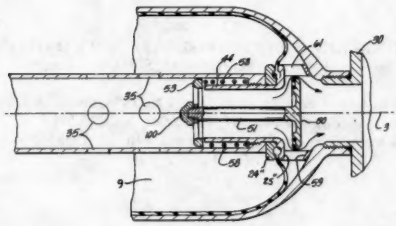
Edward J. Rozniecki, 31041 Angeline, St. Clair Shores, Macomb County, Mich. 48082

Division of Ser. No. 546,267, Oct. 28, 1983, abandoned. This application May 16, 1988, Ser. No. 194,697

Int. Cl.[4] A62C *13/26, 35/02*

U.S. Cl. 169—73 **17 Claims**





1. A fire suppressant mechanism comprising a container; a flexible bladder subdividing the container into two separate chambers; a liquid fire extinguishant occupying one of the chambers; a gaseous pressurizing agent occupying the other chamber to bias the bladder in the direction of the liquid fire extinguishant; a liquid discharge valve communicating with said one chamber, whereby when the valve opens the pressurizing agent acts on the bladder to discharge the liquid fire extinguishant through the open valve; and rigid force absorber means carried by a central area of the bladder to impact against one end of the container for limiting bladder motion without damaging the bladder material; wherein the bladder has a central annular bead therein; said rigid force absorber means comprising two rigid plates clamped together, said plates having annular confronting grooves mated to said annular bead for securely retaining the plates on the bladder.

4,889,190

SOIL WORKING MACHINE

Bruno Barlage, and Franz-Josef Robert, both of Hörstel, Fed. Rep. of Germany, assignors to H. Niemeyer Söhne GmbH & Co. KG, Hörstel, Fed. Rep. of Germany

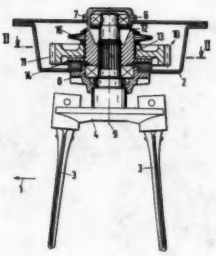
Filed Jul. 11, 1988, Ser. No. 217,499

Claims priority, application European Pat. Off., Sep. 18, 1987, 87113665

Int. Cl.[4] A01B *21/06, 61/00;* **F16D** *7/04*

U.S. Cl. 172—49.5 **16 Claims**

1. In a cultivating machine having soil working tools comprising an elongated support housing extending generally perpendicular to the direction of movement of the cultivating machine, rotary support means in said housing, a driven shaft rotatably supported by said rotary support means, said shaft driving said soil working tools, a hub body mounted on said shaft to preclude relative rotational movement between said hub body and said shaft a gear wheel rotatably mounted on said hub body, and an over-running clutch means disposed between said hub body and said gear wheel, said clutch means comprising a spring means having a first extended driving position and a second extended release position, said spring means being extended a greater amount when in said first extended position than when in said second extended position, said clutch means being operable to provide a driving connection between said hub body and said gear wheel as said spring means is in said first extended position, said clutch means being



operable during overload conditions to release said driving connection between said hub body and said gear wheel as said spring means is in said second extended position, said clutch means being operable to permit limited relative rotational movement between said gear wheel and said hub body over a clearance angle while said spring means is in said first extended position.

4,889,191

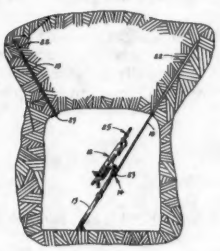
GOOSENECK ASSEMBLY FOR ROCK DRILL AND METHOD FOR INSERTING FRICTION ROCK STABILIZER

C. Lovon Fausett, Sr., P.O. Box 968, Osburn, Id. 83849

Filed Oct. 12, 1988, Ser. No. 256,491

Int. Cl.[4] E21D *20/00*

U.S. Cl. 173—1 **9 Claims**



8. A method for initial insertion of a friction rock stabilizer into a hole drilled into a wall, comprising the following steps:

substantially aligning an inner end of the stabilizer with the opening of the hole;

engaging an outer end of the stabilizer with complementary surfaces on a gooseneck that interconnects a rock drill and a jack leg

having an outer end in engagement with a fixed surface to maintain the jack leg substantially parallel to the hole; and

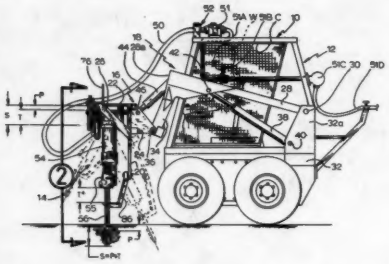
operating the rock drill to vibrate the gooseneck and engaged stabilizer while simultaneously expanding the jack leg to force the inner end of the stabilizer partially into the hole.

4,889,192

TRACTOR-CONTROLLED HAMMER ASSEMBLY

Sylvio Ricard, 1137 Dufault Street, Duvernay, Canada H7E 4S7

Filed Nov. 8, 1988, Ser. No. 270,515
Int. Cl.[4] F21B 7/02
U.S. Cl. 173—22 15 Claims



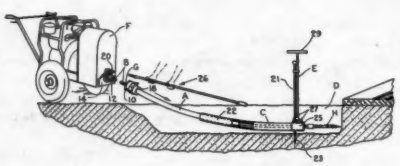
1. A hammer apparatus for breaking a layer of concrete slab or the like hard material, comprising a rigid frame, vertically adjustable holding means to hold said frame at an adjustable level above said material, at least one pneumatic hammer comprising an elongated upper body with two top transverse handle bars rigid with and extending from opposite sides of said body, a lower reciprocating head, and a drill bit releasably fixed to said drill head, support means fixedly carried by said frame and directly engageable with the underside of said handle bars to hangingly support said upper body at a lower limit position of said upper body relative to said frame, first guide means carried by said frame above said support means and directly engageable with the opposite sides of said handle bars to guide vertical displacement of said upper body between said lower limit position and a top limit position, while preventing rotation of said upper body about its longitudinal axis, second guide means carried by said frame below said support means and guiding the vertical displacement of said drill bit, and indicator means visible to a worker controlling said holding means to enable said worker to readily ascertain at what specific position is the body along said first guide means between its top and lower limit positions, whereby, during layer breaking with said hammer upright and said bit resting on said material, the level of said frame can be adjusted such that said upper body is free to vertically reciprocate relative to said first guide means between said lower and top limit positions.

4,889,193

ROTARY DRILL GUARD ASSEMBLY AND METHOD

Max H. Shy, Mauldin, S.C., assignor to McLaughlin Manufacturing Company, Greenville, S.C.

Filed Jun. 10, 1988, Ser. No. 204,703
Int. Cl.[4] E21B 7/00, 19/08
U.S. Cl. 175—62 7 Claims



1. A guard assembly for loosely encasing a drive rod of a rotary drilling system for horizontal below ground drilling comprising:

a first tube releasably secured to the drilling system encasing a portion of the drive rod attached to a power source of the drilling system;

at least one other tube encasing the drive rod remote from the drilling system in telescoping relation with said first tube; and

said tubes being of different diameters allowing for telescoping of said tubes as the drilling system is moved forwardly in a drilling operation thereby encasing a portion of the drive rod during drilling;

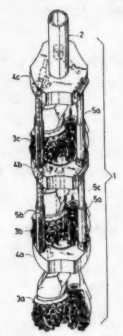
whereby removal of the first tube from the drilling system allows for telescoping of the tubes away from the power source exposing an end of the drive rod for adjustment of drive rod length.

4,889,194

METHOD AND A DEVICE FOR DEEP HOLE DRILLING

Per Danielsson, Hantverkaregatan 13, S-341 00 Ljungby, Sweden

Continuation of Ser. No. 60,391, Sep. 26, 1986, abandoned. This application Nov. 22, 1988, Ser. No. 275,641
Claims priority, application Sweden, Sep. 27, 1985, 8504473
Int. Cl.[4] E21B 10/08
U.S. Cl. 175—65 10 Claims



1. A method for exchanging a bottommost drill bit of a drilling device for an uppermore drill bit at a bottom of a drill hole drilled in the ground by the bottommost drill bit, the drilling device having the drill bits interconnected in a row, the bottommost drill bit facing the bottom of the drill hole for decomposing the ground and the uppermore drill bit being connected to a drilling rod for rotating the drilling device, the method comprising the steps of:

providing a ring-shaped groove pocket about side surfaces of a drill hole, coaxially with the drill hole and at least adjacent a bottom of the drill hole by rotating a bottommost drill bit of a drilling device against the side surfaces of the drill hole;

placing the bottommost drill bit of the drilling device into the pocket; and

releasing the bottommost drill bit while so placed for exposing an uppermore drill bit of the drilling device previously positioned above the bottommost drill bit of the drilling device and continued drilling at the bottom of the drill hole with the uppermore drill bit.

4,889,195

DRILL BIT DIRECT DRIVE FOR DEEP WELL DRILLING TOOLS

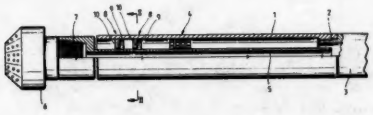
Volker Kruger, Sassengarten 8, D-3100, Celle, and Heinrich Daenicke, Sandlinger Kirchweg 10, D-3101, Wienhausen, both of Fed. Rep. of Germany

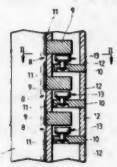
Filed Mar. 24, 1988, Ser. No. 172,589

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1987, 3709838

Int. Cl.[4] E21B 4/02

U.S. Cl. 175—107 7 Claims





1. A drill bit direct drive for deep well drilling tools, comprising:

a rotary drill bit;

a tubular casing;

a rotary machine positioned within said tubular casing and being adapted to be driven by oil well fluid flowing therethrough;

a shaft being axially mounted within said tubular casing and connected between said rotary machine and said rotary bit whereby rotation of said rotary machine is transferred through said shaft to said rotary bit; and

a bearing assembly rotatably interconnecting said shaft and said tubular casing whereby said shaft is free to rotate relative to said tubular casing, said bearing assembly comprising,

a trace ring having a preselected outer diameter, said trace ring being supported on the outer surface of said shaft and extending a preselected radial distance therefrom in a direction generally toward the inner surface of said tubular casing;

a bearing ring having a plurality of boreholes extending axially therein, said bearing ring having an inner diameter less than the trace ring outer diameter and being supported on the inner surface of said tubular casing and extending a preselected radial distance from the tubular casing inner surface in a direction generally toward said shaft, said bearing and trace rings being positioned a preselected axial distance apart;

a plurality of bearing segments being disposed axially intermediate said trace and bearing rings, each of said bearing segments having a trace ring engaging surface, a bearing ring engaging surface, and a holding pin extending from said bearing ring engaging surface into one of said bearing ring axial boreholes, each of said holding pins having a diameter substantially less than the corresponding bearing ring axial borehole diameter whereby the bearing segments are capable of limited tilting relative to said bearing ring, and providing a space between the trace ring and trace ring engaging surface having a gradually reducing axial dimension in the direction of rotation of the shaft and trace ring relative to the tubular casing and bearing ring; and

a plurality of disk springs having a bore extending therethrough and being positioned about the holding pin intermediate the bearing ring and the bearing ring engaging surface of each bearing segment, said disk springs arrangement to urge said bearing segments in a direction generally toward said trace ring.

4,889,196

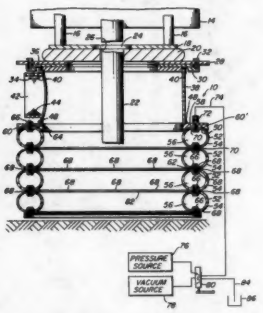
DIVERTER APPARATUS

Vaughn R. Johnston, 40 Kelley Rd., Washington, Pa. 15301

Filed Nov. 7, 1988, Ser. No. 268,486

Int. Cl.[4] E21B 21/06, 33/02

U.S. Cl. 175—209 17 Claims



1. In an earth drilling apparatus adapted for drilling a bore hole in an earthen formation by driving an elongated drill string into such an earthen formation, a selectively extensible and retractable diverter apparatus for diverting from the drilling site the cuttings which are ejected from the bore hole during drilling, said diverter apparatus comprising:

a base means having a perimeteral side wall portion with an axial extent that is adapted to extend axially of such a drill string in encompassing relation therewith;

a skirt mounting means affixed adjacent one axial end of said perimeteral wall portion;

a selectively extensible, axially elongated skirt means affixed with respect to said skirt mounting means and extending axially away from said means;

said skirt means comprising a plurality of flexible skirt elements each having defined therein a generally annular fluid chamber;

said skirt elements being serially disposed in coaxially adjacent relation and adapted to encompass such a drill string;

a plurality of connector means connecting together each serially adjacent pair of said skirt elements to maintain said serial coaxially adjacent relation thereof;

at least one of the said connector means connecting together each said serially adjacent pair of skirt elements including passage means providing fluid communication between the respective said fluid chamber;

motive fluid connection means associated with at least one of said skirt elements and adapted to connect a source of motive fluid flow to the respective one of said fluid chambers; and

at least one of said skirt elements being of a cross sectional form that results in axial extension thereof upon application of elevated pressure above ambient atmospheric pres-

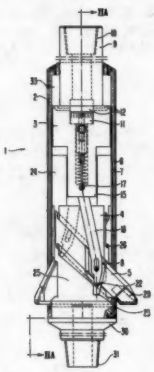
sure within the respective said fluid chambers and axial retraction thereof upon application of reduced pressure less than ambient atmospheric pressure within the respective fluid chambers.

4,889,197

HYDRAULIC OPERATED UNDERREAMER

Einar Boe, Notodden, Norway, assignor to Norsk Hydro a.s., Oslo, Norway

Filed Jun. 28, 1988, Ser. No. 213,287
Claims priority, application Norway, Jul. 30, 1987, 873188
Int. Cl.[4] E21B *7/28*
U.S. Cl. 175—267 **11 Claims**



1. A hydraulically operated underreamer to be connected to a rotatable drilling pipe for enlarging a drilled hole, said underreamer comprising:

a piston to be connected to the drilling pipe to be rotatable therewith;

a cylinder surrounding said piston and defining therewith a fluid chamber, such that upon introduction of fluid into said chamber said cylinder is axially slidable relative to said piston from a lower first position to an upper second position;

a support body within said cylinder below said piston, said support body being connected to said cylinder;

said piston and said support body having coacting coupling means for enabling said support body to move with said cylinder axially relative to said piston and for preventing relative rotation between said piston and said support body, such that said support body and thereby said cylinder rotate with said piston;

said support body having formed in the exterior thereof a plurality of circumferentailly spaced guides, each said guide extending rectilinearly in a direction at an angle to and not intersecting the longitudinal axis of said piston and said cylinder;

a plurality of cutter support arms, each said arm having a respective cutter and being guided by a respective said guide for rectilinear movement between a withdrawn inoperative position and an extended operative position; and

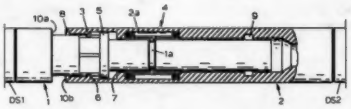
connecting means, operatively connecting said piston and said arms, for, upon said cylinder moving relative to said piston from said first position to said second position and thereby moving said support body axially toward said piston, causing said arms to move along said guides from said inoperative positions to said operative positions.

4,889,198

DRILLING JAR LATCH

David A. Buck, 118 Rue Du Pain, Broussard, La. 70518

Filed Oct. 14, 1988, Ser. No. 257,692
Int. Cl.[4] E21B *31/107*
U.S. Cl. 175—304 **3 Claims**



1. An improved latch for use in a telescoping drilling jar arranged to function as length of drill string and having an elongated housing, with an axis, and an arbor, said housing arranged to telescopingly receive said arbor, for limited axial movement therein, said housing having an opening arranged to receive and axially confine a latch situated to engage at least one latch groove in said arbor to axially secure said arbor to said housing for normal drilling and to release said arbor for movement along said axis for telescoping jarring activity, said improved latch comprising:

(a) a plurality of elongated spring bars situated in said opening, each having a length, with a general center, extending some length parallel said axis, disposed peripherally around said arbor and capable of deforming radially outward from said axis in said opening;

(b) two separated, opposed, restraint cups situated in said opening, each cup arranged to axially and radially confine one end of each of said spring bars, said cups having tubular extensions extending some distance along said spring bars toward said center to inhibit radial movement of said spring bars for said distance;

(c) at least one integral latch lug generally centered on each said spring bar extending radially toward said axis and arranged to engage said latch groove;

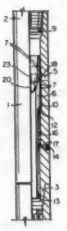
(d) at least one beveled surface on each of said lugs arranged to engage an opposing beveled surface on said groove such that axial force on said arbor relative to said housing will urge said lugs radially outward from said axis to clear said groove and release said arbor for axial movment relative to said housing for jarring activity.

4,889,199

DOWNHOLE VALVE FOR USE WHEN DRILLING AN OIL OR GAS WELL

Paul B. Lee, 1216B - 18 Avenue NW., Calgary, Alberta, Canada T2M 0W2

Filed May 27, 1987, Ser. No. 54,713
Int. Cl.[4] E21B *34/14*
U.S. Cl. 175—317 **16 Claims**



1. A downhole drilling device for a hollow drill string comprising tubular casing means for mounting in a drill string; first outlet means in said casing means for discharging fluid from said casing means; sleeve means slidably mounted in said casing

means; spring means in said casing means biasing said sleeve means to a closed position in which said sleeve means closes said first outlet means; second outlet means in said sleeve means for discharging fluid from said sleeve means when said first and second outlet means are aligned; a ball, retainer means in said sleeve means for releasably retaining said ball for preventing flow of drilling fluid through said sleeve means and causing said sleeve means to move relative to said casing means into an open position in which said first and second outlet means are aligned to discharge fluid through said casing means, a second ball for blocking said second outlet means so that pressure on said first and second balls increases sufficiently to drive said first ball through said sleeve means for restoring the normal flow of drilling fluid through said sleeve means and for allowing the return of said sleeve means to said closed position.

4,889,200

ROCK DRILL

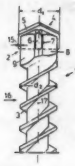
Bernhard Moser, Altshausen, Fed. Rep. of Germany, assignor to HAWERA Probst GmbH+Co., Ravensburg, Fed. Rep. of Germany

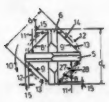
Filed Mar. 7, 1988, Ser. No. 165,092

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1987, 3707798

Int. Cl.[4] E21B *10/44, 10/58*

U.S. Cl. 175—394 **6 Claims**





1. A rock drill having a longitudinal axis comprising:

a spiral shank; and

a drill head disposed at one end of said spiral shank, said drill head having cross cutting plates extending across said drill head and projecting beyond the peripheral contour of said drill head, said cross cutting plates including primary and secondary cutting tips, said primary cutting tip having a roof shape such that the area of said primary cutting tip intersecting the longitudinal axis of said drill is disposed furthest from said drill head, said drill head further having a substantially square cross section with corners, side faces which are parallel to the longitudinal axis and each of said cutting tips extends between opposite corners of said drill head.

4,889,201

DRYING BALANCE WITH EVALUATION CIRCUIT FOR DETERMINING THE END OF THE DRYING

Christian Oldendorf, Göttingen; Günther Maaz, Uslar; Klaus Nottbohm, Sandhausen, and Volker Handwerk, Grünstadt, all of Fed. Rep. of Germany, assignors to Sartorius GmbH, Fed. Rep. of Germany

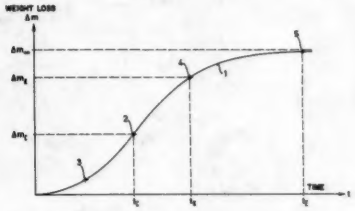
Filed Jan. 24, 1989, Ser. No. 300,898

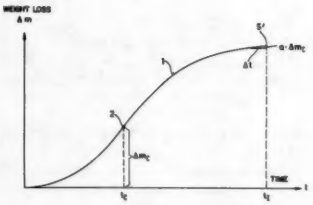
Claims priority, application Fed. Rep. of Germany, Jan. 25, 1988, 3802006

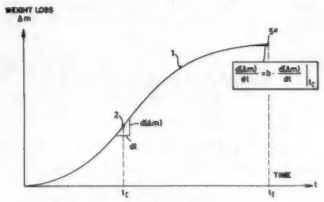
Int. Cl.[4] G01G *19/40, 23/00*; G01N *25/56*

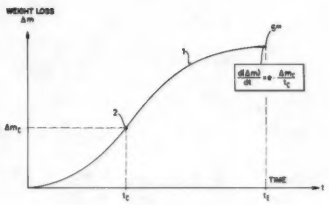
U.S. Cl. 177—25.14 **9 Claims**

1. A drying balance with a means for supplying energy for the drying of material to be weighed located on the balance scale, with a digital evaluating unit for calculating the moisture content from the measured weight loss of the specimen and for determining the end point of the drying, characterized in that







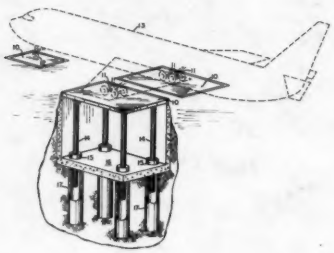


the digital evaluating unit (23,24,25) calculates the inflection point (2) from the chronological course of the weight loss (drying curve) and derives the criterion for the determination of the final point therefrom.

4,889,202
AIRCRAFT LANDING GEAR MAINTENANCE AND WEIGHING SYSTEM

Raymond Bron, 17282 Mt. Wynne Cir., Fountain Valley, Calif. 92708

Filed Aug. 1, 1988, Ser. No. 226,689
Int. Cl.[4] G01G *19/02, 19/52*
U.S. Cl. 177—134 5 Claims

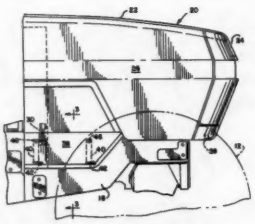


1. In a weighing table system which includes
a horizontal load-supporting platform,
column member means for supporting said platform, and
load cell means disposed between said columns and said platform,
the improvements for isolating said load cells from torsional forces applied to said columns, comprising:
(a) a hub member enclosing the top of each said column, the horizontal top surface of which directly supports one of said load cells;
(b) means interconnecting said hub member and top of said column for rotation thereof around the longitudinal axis of said column;
(c) an arm member, the inner end of which is affixed to said hub member and extending outwardly therefrom;
(d) a rigid horizontal tie-rod having one end thereof affixed to said arm at a point spaced horizontally from said hub; and
(e) bracket means carried by said platform for fixably locating the other end of said tie-rod.

4,889,203
COMPOSITE ENGINE ENCLOSURE

Jon R. Hagarty, Darien, Ill., assignor to J. I. Case Company, Racine, Wis.

Filed Aug. 12, 1988, Ser. No. 231,357
Int. Cl.[4] B62D *25/10*
U.S. Cl. 180—69.24 3 Claims

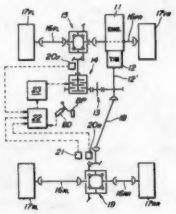


1. A composite engine enclosure for a power-driven implement, comprising:
support frame means on said implement;
a pivotal upper hood having a top portion, a front portion depending therefrom, and a pair of opposed side portions depending from respective opposite sides of said top portion, said upper hood being mounted by hood hinge means to said support frame at said front portion of said upper hood for generally vertical and forward pivotal movement about a horizontal axis between raised and lowered positions;
upper hood latching means for releasably securing said upper hood in the lowered position of said hood;
at least one lower hood panel located generally below said upper hood and rearwardly of said hood hinge means, and adjacent to a respective one of said pair of opposed side portions of said upper hood when said upper hood is in said lowered position, said lower hood panel being movably mounted on said support frame means with panel hinge means for pivotal movement between closed and open positions, said panel hinge means further permitting removal of said lower hood panel from said support frame means, said lower hood panel being positioned to shield and cover said upper hood latching means when said upper hood is in said lowered position and said lower hood panel is in said closed position by the disposition of said upper hood latching means behind said lower hood panel; and
panel latching means for releasably securing said lower hood panel in said closed position thereof.

4,889,204
DRIVE FORCE DISTRIBUTION CONTROL SYSTEM FOR FOUR-WHEEL DRIVE MOTOR VEHICLE

Kunitaka Furuya, and Yasuji Shibahata, both of Tochigi, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 19, 1988, Ser. No. 259,680
Claims priority, application Japan, Oct. 20, 1987, 62-264675
Int. Cl.[4] B60K *17/34*
U.S. Cl. 180—197 15 Claims



1. A drive force distribution control system in a four-wheel drive motor vehicle for distributing drive forces from an engine of the motor vehicle to first and second wheels of the motor vehicle, comprising:
drive force distributing means for distributing and transmitting the drive forces to said first and second wheels;
first speed detecting means for detecting a rotational speed (Nf) of said first wheel;
second speed detecting means for detecting a rotational speed (Nr) of said second wheel;
torque detecting means for detecting a torque (Tr) transmitted to said second wheel; and
control means for calculating a slip ratio (S) of said second wheel to a road on which the motor vehicle is running based on the rotational speeds of said first and second wheels, calculating a ratio (Tr/S) between said torque (Tr) and said slip ratio (S), determining a distribution ratio between the drive forces to be distributed to said first and second wheels based on said ratio between said torque and said slip ratio, and controlling said drive force distributing means to distribute and transmit the drive forces to said

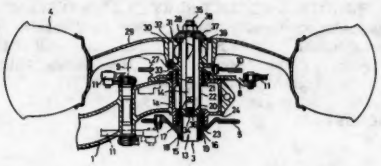
first and second wheels according to said distribution ratio.

4,889,205

REAR WHEEL HOLDING MECHANISM FOR A MOTORCYCLE

Ishikawa Yoshimi, Tokyo, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 21, 1988, Ser. No. 184,269
Claims priority, application Japan, Apr. 21, 1987, 62-99455
Int. Cl.[4] B62K *25/28*
U.S. Cl. 180—227 12 Claims



1. A rear wheel holding mechanism for a motorcycle including a swing arm pivotally connected at one end to the main frame of said motorcycle, a driving shaft supported by said swing arm at the other end thereof, said driving shaft having an externally threaded portion at one end and being coaxially inserted through the hub of said rear wheel to expose said threaded portion, and an axle nut connected to said driving shaft threaded portion, characterized in that said driving shaft comprises an outer shaft formed substantially as a hollow cylinder, an inner shaft having a diameter smaller than that of said outer shaft extending through said outer shaft, a power transmitting member attached to said outer shaft, and said inner shaft containing said threaded portion at one end for reception of said axle nut.

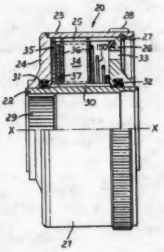
4,889,206

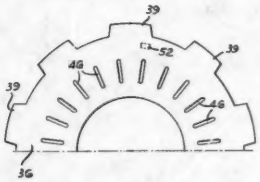
VISCOUS SHEAR COUPLING

Helmut Wiese, Neunkirchen-Seelscheid, and Paul-Erich Schönenbrücher, Much-Krünichel, both of Fed. Rep. of Germany, assignors to Viscodrive GmbH, Lohmar, Fed. Rep. of Germany

Filed Aug. 3, 1988, Ser. No. 227,830
Claims priority, application Fed. Rep. of Germany, Aug. 11, 1987, 3726641
Int. Cl.[4] B60K *17/34*; F16D *35/00*
U.S. Cl. 180—248 19 Claims

1. A motor vehicle including a prime mover and a drive transmission having front and rear pairs of drivable wheels wherein, when the vehicle is being driven, the wheels of the front pair are driven directly and permanently from the prime mover via an inter-wheel differential gear and the wheels of the rear pair are connected to the prime mover via a viscous shear coupling comprising a housing part, first and second hub parts within the housing part, extending therefrom in sealed relation thereto and connected to the respective rear wheels, all said parts being relatively rotatable about a common axis; a viscous liquid in the housing part; first, second and third sets of annular plates in the housing part, the plates of the first set being rotatable with the housing part and being interleaved with the plates of the second and third sets which are rotatable with the first and second hub parts respectively; the plates of all the sets being independently and axially movable with respect to the part with which they are rotatable, means operable by a change in the sense of relative rotation of the first part and each of the second and third parts respectively to vary the spacing between adjacent plates carried by the relatively rotating plates so that in one sense of relative rotation between said parts adjacent plates are closer together than when there is relative rotation between said parts in the opposite sense; the viscous shear coupling being arranged so that if one or both of the rear wheels overrun both of the front wheels, said parts of the viscous shear coupling connected to the overrunning





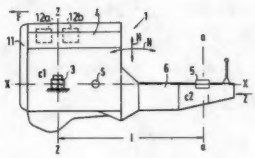
wheel or wheels are rotating relative to one another in said opposite sense thus to space apart plates in the coupling and to reduce the torque transmitted by the coupling.

4,889,207

ELASTIC BEARING FOR A DRIVING ASSEMBLY OF A MOTOR VEHICLE

Ulrich von Broock, Weissach, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Weissach, Fed. Rep. of Germany

Filed Feb. 19, 1988, Ser. No. 157,954
Claims priority, application European Pat. Off., Feb. 21, 1987, 87102493.1
Int. Cl.[4] B60K *5/00*
U.S. Cl. 180—291 5 Claims



1. An elastic bearing assembly for a vehicle provided with a driving assembly having an engine side, a transmission side and a center of gravity comprising:

(a) engine bearing means for resiliently supporting the engine side of the driving assembly and having a first predetermined spring stiffness; and

(b) transmission bearing means for resiliently supporting the transmission side of the driving assembly and having a second predetermined spring stiffness less than the first predetermined spring stiffness, the engine and transmission bearing means both being substantially located in a horizontal plane which passes through the center of gravity of the driving assembly, a ratio of the first and second

predetermined spring stiffnesses of the engine and transmission bearing means being selected to effect a coupling of the vertical movements of the driving assembly with the pitching movements of the driving assembly to the exclusion of all other vibrational movement of the driving assembly and during externally induced vibration of the driving assembly the ratio of the first and second spring stiffnesses resulting in the pitching and vertical movements of the vehicle driving assembly having frequencies at a ratio of approximately 2:1 with respect to one another, the movement of the engine bearing means, having a stiffer predetermined spring stiffness, being retarded by the movement of the transmission bearing means.

4,889,208

SPEAKER ENCLOSURES

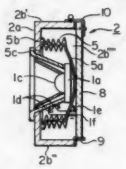
Katsutoshi Sugihara, 19-21, Aoto 2-Chome Katsushika-ku, Tokyo 125, Japan

Filed Feb. 17, 1988, Ser. No. 156,852

Claims priority, application Japan, Feb. 23, 1987, 62-3788

Int. Cl.[4] H05K *5/00*

U.S. Cl. 181—148 **13 Claims**



1. A sound reproduction speaker assembly comprising:

an enclosure formed by a plurality of panels joined to define a closed space,

an opening through one of said panels,

a speaker including a cone and an electro magnet mounted to said opening, and

a sound pressure buffer member comprising a bellows having an open interior, said bellows being closed at one end and open at another end which is mounted to one of said panels with the interior of said bellows open toward said speaker to receive sound pressure generated by said speaker internally of said enclosure.

4,889,209

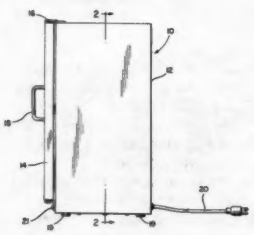
SOUND INSULATING CONTAINER FOR AN ELECTRICAL APPLIANCE

Charles Sears, Rte. 2, Box 95, Moyock, N.C. 27958

Filed Jun. 2, 1988, Ser. No. 202,018

Int. Cl.[4] G10K *11/00*

U.S. Cl. 181—200 **3 Claims**



1. A sound insulating apparatus for enclosing and containing an electrical appliance comprising:

a body having at least side walls, a bottom wall, and a rear wall, all constructed of sound absorbing material;

a door constructed of sound absorbing material for forming a sealed enclosure when in a closed position;

an electric cord attached at the exterior of said body;

an electrical outlet inside said body and electrically connected to said electric cord;

an electrical switch located on the exterior of said body when said door is in its closed position and electrically connected to said interior electrical outlet for selectively supplying electrical power to said outlet.

4,889,210

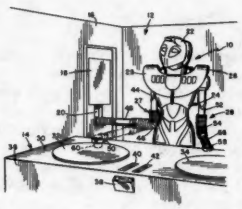
ROBOTIC PRODUCT SERVER AND SYSTEM

Alfonso Alcaraz; Gerardo Aguilar; Mauricio Gonzalez, all of Coronado, and Antonio Elizarraraz, San Diego, all of Calif., assignors to Cofusa Enterprises, Inc., Chula Vista, Calif.

Filed May 31, 1988, Ser. No. 200,731

Int. Cl.[4] E04H *3/00*

U.S. Cl. 186—38 **16 Claims**



1. A system for serving a product dispensed from a product dispenser to a customer, said system comprising:

processing means for storing a predetermined instruction set and for generating command signals according to said instruction set;

a product dispenser for dispensing products;

robotic a robot having arm means responsive to certain ones of said command signals for moving said dispensed product from a product dispenser to a first position beyond reach of a customer; and

transport means for transferring said dispensed product from said first position to a second position within reach of a customer.

4,889,211

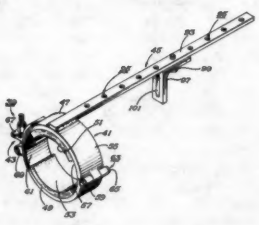
PRINTING PRESS IDLE ROLLER BRAKING SYSTEM

Sterling R. Carlson, 306 Bales, Cleburne, Tex. 76031

Filed Sep. 14, 1988, Ser. No. 244,025

Int. Cl.[4] F16D *63/00;* **B41F** *5/04, 13/02;* **B65H** *23/08*

U.S. Cl. 188—68 **9 Claims**



8. In a press for printing on a web sheet, with lint and ink carried by the web, said web being routed therethrough in part

by a cylindrical idle roller rotated relative to said press at a high speed by frictional circumferential contact between an outer circumferential periphery of said cylindrical idle roller and said web sheet, a braking system comprising:

an upper clamp arm with inner and outer surfaces;

a lower clamp arm with inner and outer surfaces;

at least one upper resilient gripper pad carried by said upper clamp arm along said inner surface;

at least one lower resilient gripper pad carried by said lower clamp arm along said inner surface;

means for pivotally coupling said upper and lower clamp arms, for opening in a mounting position for placement around said cylindrical idle roller, and for closing in gripping position around said cylindrical idle roller with said at least one upper resilient gripper pad and said at least one lower resilient gripper pad urged into circumferential contact around at least a portion of said cylindrical idle roller, providing a frictional resistance to rotation of said cylindrical idle roller to reduce said high speed of rotation;

means for locking said upper and lower clamp arms in said gripping position around said cylindrical idle roller;

means for adjusting the position of said upper and lower clamp arms while locked in said gripping position by means for locking to alter said frictional resistance to said rotation of said cylindrical idle roller to modify said speed of said cylindrical idle roller; and

wherein said braking system reduces the high speed of said cylindrical idle roller a selected amount, creating tension in said web and minimizing accumulation of lint and ink on said cylindrical idle roller.

4,889,212

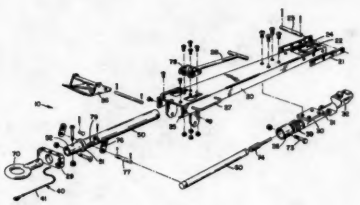
SURGE BRAKE

Roger C. Temple, Cuyahoga Falls, Ohio, assignor to Joseph D. Alvado, Cleveland, Ohio

Filed Feb. 16, 1988, Ser. No. 156,401

Int. Cl.[4] B60T 7/20

U.S. Cl. 188—112 R **20 Claims**



6. An improved trailer drawbar brake operator comprising a body, said body having two ends, hinge means to rotatively connect one end of said body of the drawbar to the trailer, a brake unit, means to mount said brake unit to said one end of said body substantially neighboring said hinge means, hitch means, an extension tube, said extension tube having two ends, means to connect said hitch means to one end of said extension tube, means to slidably mount said extension tube to the other end of said body of said drawbar, a brake push rod, means to connect said brake push rod to said brake unit to operate said brake unit, a lost motion connection means connecting the other end of said extension tube to said brake push rod, spring means between said other end of said extension tube and said drawbar, means to selectively operate said brake push rod independently of said spring means, part of said brake push road extending within said extension tube and said means to selectively operate said brake push rod independently of said spring means engaging said part of said brake push rod within said extension tube.

4,889,213

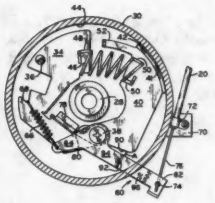
COMPLIANCE BRAKE FOR AN INTERNAL COMBUSTION ENGINE POWERED IMPLEMENT

Lee E. Roller, Newburg, Wis., assignor to Tecumseh Products Company, Tecumseh, Mich.

Filed Aug. 26, 1988, Ser. No. 237,293

Int. Cl.[4] F16D 51/12

U.S. Cl. 192—1.44 **23 Claims**



1. In an internal combustion engine powered implement having a crankshaft, a flywheel secured to said crankshaft, and a deadman control normally biased toward a first position wherein the engine is inoperative, said deadman control being actuable to a second position by an operator to enable said engine to operate, a safety device comprising:

a single only pivot means;

a braking lever pivotably mounted on said pivot means and including a first friction surface for contacting a second friction surface of said flywheel when said deadman control is in said first position; and

a control lever means pivotably mounted on said pivot means and actuable by said deadman control in said second position to contact said braking lever and cause said braking lever to pivot and disengage said first friction surface from said second flywheel friction surface, said braking lever and said control lever means being coaxially pivotable relative to each other.

4,889,214

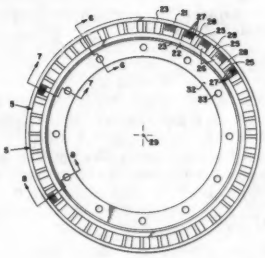
BRAKE AND CLUTCH HUB

Jimmey Crossan, Brooksville; Buford Maynard, Gulf Hammock, and Dennis Tew, Trenton, all of Fla., assignors to Florida Rock Industries, Inc., Jacksonville, Fla.

Filed May 9, 1988, Ser. No. 191,572

Int. Cl.[4] F16D 67/02

U.S. Cl. 192—17 R **19 Claims**



1. In a circular hub having an outside drum having an outward planar surface adapted to cooperate frictionally with a brake band and an inside drum having an inner planar surface adapted to cooperate frictionally with a clutch band; the improvement which comprises a plurality of circumferentially spaced, radially oriented heat conducting fins between said

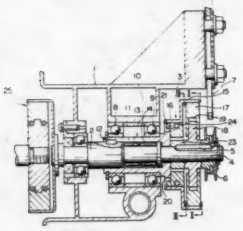
outside drum and said inside drum, said fins being attached in a heat conducting relationship to said outside drum and being unattached and spaced apart from said inside drum whereby heat generated in said outward planar surface of said outside drum by a brake band is not conducted to said inside drum.

4,889,215

ANTI-OVERLOAD CENTRIFUGAL CLUTCH

Masao Ohkanda, Sagamihara, Japan, assignor to Kioritz Corporation, Tokyo, Japan

Continuation of Ser. No. 61,012, Jun. 1, 1987, abandoned. This application Oct. 25, 1988, Ser. No. 262,011
Claims priority, application Japan, Dec. 8, 1986, 61-187987
Int. Cl.[4] F16D *43/18, 43/30*
U.S. Cl. 192—48.1 **6 Claims**



1. An anti-overload centrifugal clutch, connecting a driving shaft to a driven shaft, the centrifugal clutch comprising

a sleeve shaped driving member connected to the driving shaft and rotatably mounted with respect to and coaxially enclosing a portion of the driven shaft;

a clutch drum secured to the driving shaft by said sleeve shaped driving member;

a plurality of centrifugal clutch shoes engaged with the driven shaft for contact with and movement away from said clutch drum;

a plurality of centrifugal members having arcuate surfaces of radially inner sides of said respective centrifugal members and engaged with said driving shaft on said clutch drum;

a cylindrical portion on the driven shaft having a smooth outer periphery disposed in face-to-face relationship with said arcuate surfaces; and

a spring acting on said centrifugal members to bring said arcuate surfaces of the radially inner sides of said respective centrifugal members into frictional contact with said outer periphery of said cylindrical portion, said centrifugal members releasing the embracing frictional contact when the rotation of the driving shaft reaches a predetermined rotational speed.

4,889,216

CLUTCH ARRANGEMENT, MAINLY FOR DRIVING THE TAPE-SPINDLE OF MAGNETIC TAPE RECORDER AND/OR PLAY-BACK UNIT

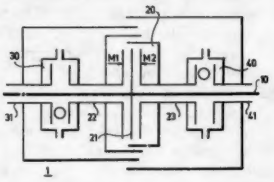
Gábor Nagy, and György Neumann, both of Budapest, Hungary, assignors to Egyesult Izzolampa es Villamossagi RT, Hungary

Filed Apr. 27, 1988, Ser. No. 186,957
Int. Cl.[4] F16D *13/08;* F16H *1/44.5*
U.S. Cl. 192—48.4 **16 Claims**

8. A clutch arrangement having three connection points for transmitting a first specific torque to a shaft from a first driving means and a second specific torque from a second driving means, including null speed drive, said clutch arrangement comprising:

(a) a double-sided asychronous switchgear having a central disk connected to said shaft at the first of said three connection points;

(b) a first free-wheel, having a locking direction, connecting one side of said double-sided asynchronous switchgear to said first driving means, thus forming the second of said three connection points; and



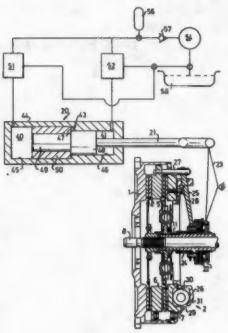
(c) a second free-wheel connecting the second side of said double-sided asynchronous switchgear to said second driving means forming the third of said three connection points, wherein said second free-wheel has a locking direction opposite of said first free-wheel.

4,889,217

MOTOR VEHICLE CLUTCH FOR A MECHANICAL, MULTIPLE-SPEED AUTOMATIC TRANSMISSION

Gzegorz Janiszewski, Angered; Thomas Sahlmen, and Mats Nystrom, both of Gothenburg, all of Sweden, assignors to Ab Volvo, Gothenburg, Sweden

Filed Sep. 21, 1987, Ser. No. 98,875
Claims priority, application Sweden, Sep. 24, 1986, 8604041
The portion of the term of this patent subsequent to Oct. 6, 2004, has been disclaimed.
Int. Cl.[4] F16D *25/063, 25/11*
U.S. Cl. 192—48.91 **3 Claims**



1. Motor vehicle clutch, particularly for a mechanical, multiple-speed automatic transmission, comprising: a clutch disc which is non-rotatably joined to an input shaft to the transmission, said disc being pressable against an engine flywheel by means of a drive plate which is axially displaceable but non-rotatably relative to the flywheel; a second drive plate which is solidly joined to the flywheel; a second clutch disc which is arranged between the drive plates and is non-rotatably joined to a hollow shaft which is concentrically mounted on said input shaft; and pressure medium-actuated control means comprising a piston-cylinder device by means of which the first drive plate is, on the one hand, alternately pressable against said clutch discs and, on the other hand, settable in an intermediate position in which both of the clutch discs are not loaded by the first drive plate; a centrifugal device being arranged which, when the first drive plate is set in said intermediate position, loads the first drive plate in the direction towards the second disc with a force dependent on the engine speed, the

piston-cylinder device (20) having a piston means (43) and a cylinder bore (45, 46) and only two cylinder chambers (40, 41) such that when pressure medium at equal pressure is supplied at the same time to said cylinder chambers (40, 41) on either side of the piston means, a portion thereof joined to a piston rod (21) assumes an intermediate position in which the first drive plate (6) assumes its intermediate position and when pressure medium is supplied to only one or the other of the cylinder chambers, the portion (48) of the piston joined to the piston rod assumes one of two end positions, in which the drive plate is pressed against one of the clutch discs (4, 5), the control means comprising first and second valve means (51, 52) for regulating flow of pressure medium to and from the respective individual cylinder chambers (40, 41), one of said valve means being capable of pressure regulation to effect controlled gradual pressure change in its respective said cylinder chamber while the other valve means has only an on-off function.

4,889,218

TORSION-DAMPING FLYWHEEL

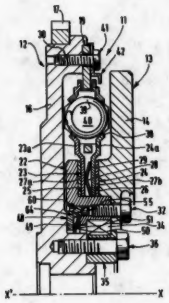
Gustave Chasseguet, Taverny, and Jacques Paquin, Villeneuve-la-Garrenne, both of France, assignors to Valeo, Paris, France

Filed Jul. 14, 1988, Ser. No. 218,997

Claims priority, application France, Jul. 15, 1987, 87 09920; Jul. 15, 1987, 87 09921

Int. Cl.[4] F16D *3/14*

U.S. Cl. 192—106.2 **7 Claims**



1. A torsion damping flywheel comprising two parts mounted for relative rotational movement about a common axis, said parts comprising respectively an input part connected to a driving shaft, and an output part; and springs interposed between said parts adapted to control circumferentially the relative movement; said output part comprising a hub and two discs associated with a torque limiter disposed between two flat annular bearings, said discs defining radially, externally relative to said torque limiter, two guiding flanges spaced relative to each other and in which there are provided openings accomodating said springs; a single annular flange being engaged between the two discs for co-operation with said springs and being fastened to an inertial plate of said input part by assembly means disposed externally relative to said springs.

4,889,219

METHOD AND APPARATUS FOR THE RECEIVING OF CARBON BLACK PELLETS FOR WEIGHING PRIOR TO INJECTION INTO A MIXER WHICH INHIBITS THE ACCUMULATION OF CARBON BLACK FINES ON INTERNAL SURFACES

Ted G. Key, HCR3, Box 865 F1, New Braunfels, Tex. 78132

Continuation of Ser. No. 25,966, Mar. 16, 1987, abandoned. This application Aug. 16, 1988, Ser. No. 233,842

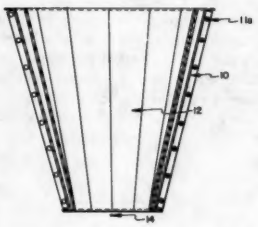
Int. Cl.[4] B65G *11/10*

U.S. Cl. 193—25 R **8 Claims**

1. A method for receiving and discharging carbon black pellets prior to injection into an internal mixer comprising the steps of:

supplying carbon black pellets to a hopper means having a flexible liner and being of generally conical shape;

maintaining the entire surface of the flexible liner in a state of tension when no pellets are present in the hopper by means of a structural framework constructed of steel or similar material which is attached to the liner equally about the perimeter and along vertical planes wherein said



entire surface of said flexible liner is tensioned in all directions;

flexing the flexible liner as pellets are received to store kinetic energy in said flexible liner;

releasing the kinetic energy stored in said flexible liner as pellets are discharged in a manner which returns said flexible liner to its equilibrium position and which thereby accelerates any carbon black fines on the liner surfaces radially inward in order to inhibit the accumulation of carbon black fines on the liner surfaces.

4,889,220

AUTOMATIC MONEY DEPOSITING APPARATUS

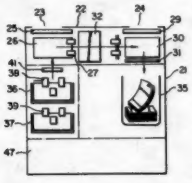
Koshida Yoshinori; Isobe Minoru, and Suto Shin-ichi, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jul. 27, 1987, Ser. No. 77,864

Claims priority, application Japan, Aug. 6, 1986, 61-183299; Oct. 21, 1986, 61-248328

Int. Cl.[4] G07F *7/04*

U.S. Cl. 194—206 **3 Claims**



1. An automatic money depositing apparatus comprising:

a customer access panel having a receiver slot for receiving moneys deposited by a customer and a return slot for returning moneys deposited by the customer;

a separator/feeder means for separating and feeding the moneys one by one which have been received through said receiver slot;

a discriminator means for checking whether the moneys fed by said separator/feeder means are true or false and for identifying denominations of said moneys;

a temporary storage unit for temporarily storing true and false moneys separately, said temporary storage unit being located adjacent to said return slot and said separator/-feeder means and said discriminator means being disposed behind said customer access panel and said separator/-

feeder means, said discriminator means, and said temporary storage unit are disposed behind said customer access panel and directed horizontally in rightward and leftward directions relative to the customer;

a money container for storing the true moneys delivered from said temporary storage unit;

an input means operable by the customer to indicate approval or nonapproval of a money deposit made by the customer through said receiver slot; and

a control means for opening said return slot to allow the customer to remove the money directly from said temporary storage unit when the money is returning to the customer, and for opening at least one of said receiver slot and said return slot to allow the customer to remove the money remained in said depositing apparatus directly from depositing apparatus when a jammed note occurs in said depositing apparatus before the indication of approval or nonapproval of the money deposit is made by the customer.

4,889,221

VENDING MACHINE FOR NEWSPAPERS OR PERIODICALS

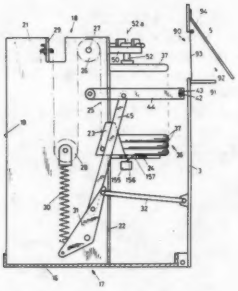
Alois Schlumpf, Zumikon, Switzerland, assignor to Journomat AG., Zurich, Switzerland

Filed Jul. 19, 1988, Ser. No. 221,496

Claims priority, application United Kingdom, Jul. 28, 1987, 8717882

Int. Cl.[4] G07F *11/14*

U.S. Cl. 194—345 **15 Claims**



1. An automatic vending machine for newspaper or periodicals which comprises a housing having a front panel formed with a dispensing slot in the front panel, a table for supporting a stack of newspapers or periodicals slidably supported for parallel vertical movement within the housing, a spring for biasing the table in the upward direction, a post disposed adjacent one edge of table above the front of the table, the stack abutting against the post, an arm pivotable about a vertical pivot axis substantially coaxial with the post and containing a pivotable gripper element with gripper needles, a releasable catch for holding the gripper element in the retracted position of the gripper needles, and a handle for pivoting the arm about its axis, said arm including a bar which is pivotable about said vertical pivot axis and a pushing lever pivotably supported at its rear end by said bar, and wherein said gripper element is a segment of about 270° with a cylindrical rolling surface rotatably supported at the front end of said pushing lever, said catch cooperating with one of the surfaces of the cutout in said segment and said needles extending from the cylinder in approximately the opposite direction to said one of the surfaces.

4,889,222

BALUSTRADE STRUCTURE FOR CURVED ESCALATOR

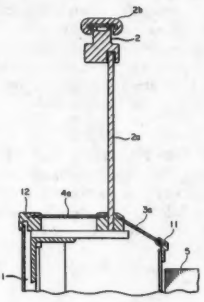
Osamu Kanamori, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Continuation of Ser. No. 768,879, Aug. 23, 1985, abandoned. This application Apr. 8, 1987, Ser. No. 36,206

Claims priority, application Japan, Aug. 27, 1984, 59-177654; Dec. 13, 1984, 59-263175; Dec. 13, 1984, 59-263176; Jan. 28, 1985, 60-13818; Jan. 28, 1985, 60-13819

Int. Cl.[4] B66B *21/06, 23/22*

U.S. Cl. 198—328 **10 Claims**



1. A balustrade structure for a curved escalator comprising a curved main frame, an inclined curved balustrade mount member on said frame, a vertical balustrade panel having a mounting portion carried by said mount member, and a balustrade panel mounting portion cover constructed of outer and inner deck boards for mounting on outer and inner sides of said balustrade panel secured to said inclined curved balustrade mount member, said boards comprising strips of sheet material curved in plan and straight in the entire transverse direction before mounting, and joints comprising means for retaining edges of said inner and outer deck boards in a manner which will accommodate deviation from a two-dimensional shape, said sheet material having a thickness which is so very much smaller than a radius of said curved escalator that said inner and outer deck boards are caused to twist three-dimensionally upon mounting.

4,889,223

DISTRIBUTION-TRANSFERRING DEVICE FOR ARTICLES TO BE CONVEYED INCORPORATED IN A CONVEYER

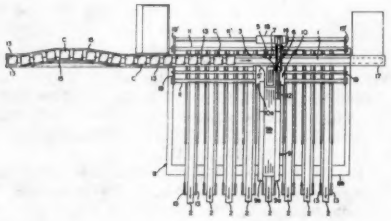
Anders Bergstrom, Lund, Sweden, assignor to AB Tetra Pak, Osaka, Japan

Filed Feb. 12, 1988, Ser. No. 155,308

Claims priority, application Japan, Feb. 19, 1987, 62-23686[U]

Int. Cl.[4] B65G *47/10*

U.S. Cl. 198—364 **6 Claims**



1. A distribution transferring device for articles to be con-

veyed incorporated in a conveyer characterized in that a plurality of lines of conveyers having flat traversing surfaces are disposed under an area before the terminating end of a traversing truck of a main conveyer which also has a flat traversing surface and is designed to convey articles of a predetermined shape, such that the directions of the traversing trucks of said plurality of conveyers at the starting ends thereof are at right angles relative to the traversing direction of said main conveyer with truck lines being spaced and closely adjoined to one another, a receiving inlet for said articles to be conveyed is opened to the opposite side to the traversing direction of said main conveyer and is provided at an area before said terminating end of said traversing truck, and a distribution unit which is equipped with a traversing direction change-over member guiding said articles at a right angle relative to said traversing direction of said main conveyer and a downwardly sloping chute in combination with said traversing direction change-over member allows said articles to be fed onto the traversing surface of any of said plurality of conveyers provided such that said distribution unit is movable parallel to said area before the terminating end of said traversing truck of said main conveyer along the section wherein said plurality of lines of said plurality of conveyers are disposed, said traversing direction change-over member is provided between said receiving inlet for said articles and said downwardly sloping chute and includes a pair of arcuate guide plates which face each other and open to the opposite direction to the traversing direction of said main conveyor and with a sliding plate adjoining the side of said main conveyor, the combination between said traversing direction change-over member and said downwardly sloping chute is made by a hinge joint so that the downwardly sloping chute may be movable in a swinging manner, said distribution unit is provided on said area before said terminating end of said traversing truck such that said distribution unit is slidable with respect to guide bars provided parallel to said terminating end thereof, and a piston-cylinder assembly having one end slidably mounted on said guide bar and a second end attached to said chute for pivoting said chute.

4,889,224

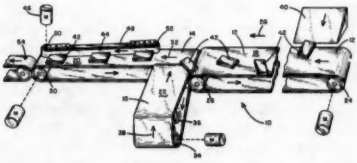
PRODUCT ALIGNMENT DEVICE

Stanley D. Denker, New Richmond, Wis., assignor to Doboy Packaging Machinery, Inc., New Richmond, Wis.

Filed Mar. 27, 1989, Ser. No. 329,348

Int. Cl.[4] B65G *47/24*

U.S. Cl. 198—382 **7 Claims**



1. Apparatus for aligning randomly oriented products of predetermined length and width dimensions in serial, head-to-tail relation while said products are traversing a moving belt conveyor system comprising:

(a) a first endless conveyor belt trained about a drive roller and a driven roller to define a horizontal flight with an upstream end and a downstream end and moving at a first rate in a first direction for receiving said products thereon in random order;

(b) a second endless conveyor belt trained about a drive roller and a driven roller to define a horizontal flight and an upstream end and a downstream end and longitudinally aligned with said horizontal flight of said first conveyor, said second conveyor moving at a second rate in said first direction, said second conveyor belt being of a lesser width than said first conveyor belt; and

(c) a third endless belt with an upstream end and a downstream end and trained about a drive roller and a driven roller to define a horizontal flight moving generally perpendicular to said first direction, said horizontal flight of said third endless belt positioned adjacent said downstream end of said first conveyor with said downstream end of said third endless belt abutting a side edge of said second endless belt proximate said upstream end of said second conveyor.

4,889,225

DEVICE FOR SUPPLYING CONTAINERS TO AN APPARATUS FOR HANDLING THEM

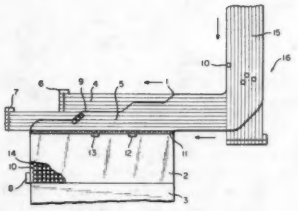
Johannes H. van Uitert, Vaartweg 33, 5109 RB 's-Gravenmoer, Netherlands

Filed Dec. 16, 1987, Ser. No. 133,803

Claims priority, application Netherlands, Dec. 17, 1986, 8603212

Int. Cl.[4] B65G *41/12*

U.S. Cl. 198—444 **6 Claims**



1. A device for supplying containers, especially bottles, to an apparatus for handling them, in particular a rinsing machine, said device comprising:

first and second conveyors adapted and arranged to convey the containers to the apparatus in a desired number of rows, said first conveyor being directed transversely to the second conveyor and comprising at least two juxtaposed, separately driven conveyor tracks;

a guide means present above the first conveyor for guiding and pushing the containers from the first conveyor onto the second conveyor; and

a plurality of sensors positioned at a mutual distance next to the transition between the first and second conveyors for detecting whether containers are lacking at that place and, in such event, operable to increase the velocity of the first conveyor relative to the second conveyor, said sensors connected to control means for the first and second conveyors in such a way that, as seen in the conveying direction, the first sensor controls the velocity of the conveyor track positioned at the greatest distance from the second conveyor, and a succeeding sensor controls the velocity of the next conveyor track.

4,889,226

APPARATUS FOR TRANSFERRING BLOCK-SHARD GROUPS OF ROD-SHAPED ARTICLES OF THE TOBACCO PROCESSING INDUSTRY

Reinhard Deutsch, Geesthacht, Fed. Rep. of Germany, assignor to Körber AG, Hamburg, Fed. Rep. of Germany

Filed Jul. 7, 1988, Ser. No. 216,322

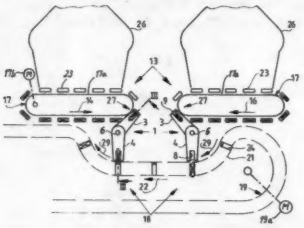
Claims priority, application Fed. Rep. of Germany, Jul. 11, 1987, 3723001

Int. Cl.[4] B65G *47/68*

U.S. Cl. 198—450 **17 Claims**

1. Apparatus for manipulating unconfined arrays of rod-

shaped articles of the tobacco processing industry, comprising intermittently driven article-supplying first conveyor means having a plurality of first receptacles for arrays of rod-shaped articles and defining for said receptacles a first predetermined path, each of said first receptacles having outlet means for arrays of rod-shaped articles; continuously driven article-receiving second conveyor means including an endless conveyor having a plurality of second receptacles for arrays of rod-shaped articles and including a reach defining for the second receptacles a second predetermined path, each of said second receptacles having inlet means for arrays of rod-shaped articles; and means for transferring arrays of rod-shaped articles from the first receptacles into the second receptacles, including at least one pair of third receptacles for arrays of rod-shaped articles and means for intermittently indexing said third receptacles in a single direction about a common axis along a third predetermined path so that successive intervals of



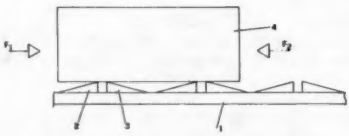
standstill of said third receptacles alternate with successive intervals of anguiar movement of said third receptacles about said axis at the speed of said second conveyor means, each of said third receptacles having inlet means and outlet means for arrays of rod-shaped articles, one of the inlet and outlet means of each third receptacle being disposed in parallelism with said common axis and the other of the inlet and outlet means of each third receptacle being disposed radially of said common axis, said third path having a first portion aligned with a portion of said first path and a second portion aligned with a portion of said second path, said portion of said second path constituting a portion of a circular path having a center of curavature on or close to said common axis, said third receptacles alternatingly registering with discrete first receptacles in said portion of said first path during successive intervals of standstill and with discrete second receptacles in said portion of said second path during successive intervals of angular movement.

4,889,227

CONVEYOR BELT WITH PROJECTIONS INCLINED IN THE OPPOSITE DIRECTION

Dario Toncelli, Via Giovanni XXIII, 2, Bassano del Grappa (Vicenza), Italy

Filed Jul. 21, 1987, Ser. No. 76,018
Claims priority, application Italy, Jul. 29, 1986, 85581 A/86
Int. Cl.[4] B65G *15/42*
U.S. Cl. 198—699.1 **4 Claims**



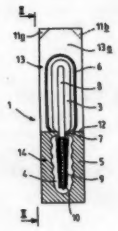
1. A conveyor belt for conveying articles of marble, stone and the like being subjected to various operations of grinding, polishing and for maintaining the articles stable during said operations, along the path of the conveyor, which comprises a plurality of inclined projections of right angle triangular cross section in the longitudinal direction and rectangular when viewed above the conveyor and located on the surface of the conveyor belt along the entire width thereof and forming rows along the entire length thereof, said projections of each row being alternately arranged in opposite directions along the longitudinal direction of the conveyor, and being made of a material of predetermined mechanical properties, depending upon the particular applications of use, said projections under the weight of said article being conveyed being capable of deforming slightly, therefore ensuring sufficient adherence of the article being conveyed and the immobility of said article with respect to said conveyor belt, even under the actions of longitudinal thrusts in one or the opposite direction.

4,889,228

SINGLE-USE MAKEUP SET

Jean-Louis Gueret, Paris, France, assignor to L'Oreal, Paris, France

Filed Dec. 28, 1988, Ser. No. 291,293
Claims priority, application France, Dec. 29, 1987, 87 18295
Int. Cl.[4] A45D *40/00, 40/26*
U.S. Cl. 206—209 **18 Claims**



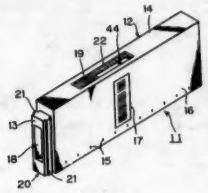
1. A makeup set, for testing a fluid cosmetic composition, comprising a package including an applicator comprising an element for holding in the hand and a device for distributing the composition to be tested, wherein said package has a chamber in which said distribution device is located and which is filled with the composition to be tested and said package comprising two sheets partially welded to one another, with a constricting zone formed between said sheets at a zone located between the element for being held in the hand and the distributor device of said applicator, and wherein said package has two separate portions, (13, 14; 113, 114), a first portion (13, 113) being capable of being opened and including a first, non-welded zone and a second zone where the sheets (2*a*, 2*b*; 102*a*, 102*b*) are connected to one another by a welded bead (6, 106) that defines a space (3, 103) containing the element (8, 108) for holding in the hand and which is connected to the second portion (14, 114) of the package, in which second portion (14, 114) the two sheets (2*a*, 2*b*; 102*a*, 102*b*) are welded in such a manner as to prevent their separation by manual action, the welding of said second portion (14; 114) defining said chamber, said chamber containing the distributor device (9, 109) of the applicator.

4,889,229

CASSETTE FOR STORING A PLURALITY OF ELECTRONIC COMPONENT CHIPS

Shinya Yamamoto, and Koichi Saito, both of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Apr. 20, 1988, Ser. No. 184,112
Claims priority, application Japan, Apr. 20, 1987, 62-96925
The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.
Int. Cl.[4] B65D *73/02, 43/20*
U.S. Cl. 206—328 5 Claims



1. A cassette for storing a plurality of electronic component chips and for providing said plurality of electronic component chips to an apparatus for supplying electronic component chips, said cassette comprising:

case means internally provided with a main, open storage space for storing a plurality of electronic component chips arrayed in random positions and orientations, first and second outer wall surfaces adjacently intersecting with each other and an outlet formed in said first outer wall surface to communicate with said storage space and for discharging said electronic component chips; and

openable closure means closing said outlet, said closure means being formed by a flexible plate;

said case means being provided with a guide portion for slidably guiding said closure means over a portion along said first outer wall surface and a portion along said second outer wall surface, said closure means being guided by said guide portion to open and close said outlet with one end portion thereof being positioned along said second outer wall surface whether said outlet is opened or closed;

slidable opening/closing operation means for opening and closing said closure means being provided in said one end portion of said closure means to be exposed on said second outer wall surface;

a mounting part being provided in the vicinity of said first outer wall surface of said case means for detachably mounting said case means on an apparatus for supplying said electronic component chips with said outlet being directed to said apparatus.

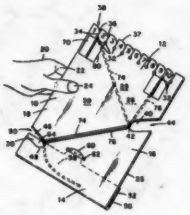
4,889,230

PACKAGE OF STRUNG MEDICAL SPONGES

Kathy W. Zachry, Kingston, Tenn., assignor to DeRoyal Industries, Powell, Tenn.

Filed Feb. 17, 1989, Ser. No. 312,695
Int. Cl.[4] B65D *73/00*
U.S. Cl. 206—362 11 Claims

1. A package of strung medical sponges comprising a plurality of said sponges releasably held on a planar member, said planar member being sufficiently stiff as to be self-supporting and having first and second major surfaces, first and second end margins and first and second side margins, said end and side margins defining the perimeter of said planar member, means defining a plurality of string receiving openings through the thickness of said planar member adjacent the first end margin thereof, means defining a first slot means opening outwardly of said first side margin of said planar member and spaced away from said first end margin, means defining a second slot means opening outwardly of said second side margin of said planar member and spaced away from said first end margin by a distance substantially greater than the spatial distance between said first slot means and said first end margin, foldable flap means defined along said second end margin and including a planar flap portion adapted to fold back upon said first major surface of said planar member in the region of said second end margin and define a capture zone for string ends therebetween, and means for retaining said flap portion in such folded position, said sponges being positioned adjacent said first end margin in generally overlying relationship to said second major surface of said planar member with their respective string being received in said string receiving openings and



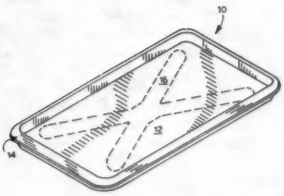
through the thickness of said planar member, thence extending in overlying relationship to said first surface of said planar member in the direction of said first slot means, thence being received in said first slot means to extend to said second surface of said planar member, thence extending in overlying relationship to said second surface of said planar member in the direction of said second slot means, thence being received in said second slot means to extend to said first surface of said planar member, thence extending in overlying relationship to said second surface of said planar member such that the unattached ends of said strings terminate in said capture zone defined between said flat means and said first surface of said planar member.

4,889,231

SURGICAL PROCEDURE TRAY

Mark A. Foote, Lake Zurich, and Stephen J. Carter, Glencoe, both of Ill., assignors to Baxter International Inc., Deerfield, Ill.

Filed Jun. 6, 1989, Ser. No. 362,193
Int. Cl.[4] B65D *1/34, 1/40*
U.S. Cl. 206—363 15 Claims



1. A tray for holding surgical supplies, said tray comprising:

a bottom portion positioned substantially horizontal, said bottom portion having a periphery;

an upwardly extending lip surrounding at least a portion of the periphery of said bottom portion, said lip having a predetermined thickness;

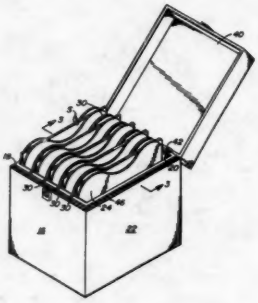
an elbow connected to said lip, said elbow having a thickness less than said lip predetermined thickness;
a downwardly extending ledge connected to said elbow;
a peripheral tip connected to said ledge, said tip and said ledge forming an angle of less than 180°.

4,889,232

STORAGE DEVICE FOR SHEETS OF SANDPAPER

Allan E. Asleson, 2107 St. Augustine Cir., Petaluma, Calif. 94952

Filed Mar. 27, 1989, Ser. No. 329,559
Int. Cl.[4] B65D *25/06, 25/10*
U.S. Cl. 206—449 **7 Claims**



1. A device for storing sheets of sandpaper having a predetermined length and width, said device comprising, in combination:
a housing including an end wall and a plurality of interconnecting side walls projecting from said end wall and defining an interior;
dividers projecting from at least some of said side walls and dividing said interior into a plurality of compartments, each said compartment being of a size and configuration to accommodate therein a plurality of sandpaper sheets disposed in generally aligned, generally parallel relationship perpendicular to said end wall;
a pair of press plates loosely disposed in at least one of said compartments generally perpendicular to said end wall, said press plates having height and width generally corresponding to the height and width of said sandpaper sheets and each press plate of said pair of press plates in a compartment positionable against the outermost sheet of the plurality of sandpaper sheets in said compartment; and
a cover attachable to said housing to isolate said interior from ambient conditions, said cover, said housing, and said dividers cooperating with said press plates to maintain said press plates generally perpendicular to said end wall and restrict movement of said press plates to directions generally parallel to said end wall.

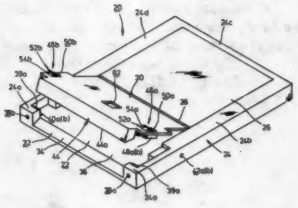
4,889,233

CASSETTE FOR STIMULABLE PHOSPHOR SHEET

Shumpeita Torii, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 20, 1987, Ser. No. 110,295
Claims priority, application Japan, Oct. 20, 1986, 61-249084; Oct. 20, 1986, 61-249085
Int. Cl.[4] B65D *85/00*
U.S. Cl. 206—455 **14 Claims**

1. A cassette for a stimulable phosphor sheet, comprising a casing for storing the stimulable phosphor sheet therein, a cover openably and closably mounted on a portion of said casing, a light-shielding plate mounted on the remaining portion of said casing for cooperating with said cover in keeping the stored stimulable phosphor sheet in a light-shielded condition, and lock means for locking the cover on said casing in a closed position, the arrangement being such that after releasing said lock means the stimulable phosphor sheet can be taken out



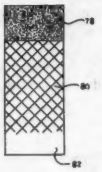
of said casing by opening said cover and further comprising means for releasing said lock means in at least two different directions.

4,889,234

PATTERNED ADHESIVE LABEL STRUCTURES

Terry J. Sorensen, Sherman Oaks, and Bill W. Wyss, Glendora, both of Calif., assignors to Avery International Corporation, Pasadena, Calif.

Continuation-in-part of Ser. No. 873,372, Jun. 12, 1986, Pat. No. 4,771,891. This application Sep. 14, 1988, Ser. No. 244,723
The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.
Int. Cl.[4] B65D *17/50*
U.S. Cl. 206—459 **24 Claims**



1. A combined dispensing label and product container comprising:
a product container having means for providing a dispensing opening with a first portion of said container closing said opening, and with said first portion being in closing proximity with a second portion of said container;
label means having a permanent pressure-sensitive adhesive thereon, for extending across and reclosing said opening;
said label means having substantially full permanent pressure-sensitive adhesive coverage in one area thereof engaging said first portion of said container to permanently secure said label to said first portion of said container adjacent said opening;
said label having a light, fine pattern of said permanent pressure-sensitive adhesive extending across said opening and selectively into engagement with said second portion of said container, and constituting means for resealably engaging said second portion of said product container to resealably close said opening; and
the permanent pressure-sensitive adhesive in said full adhesive coverage being of the same composition as that in said light, fine pattern of adhesive, so that the entire adhesive pattern on said label may be applied to said label in a single coating operation.

9. A label for resealing a container comprising:
a label;
means for permanently securing a portion of said label to an object, said means including a full coverage coating of a

permanent pressure-sensitive adhesive on a first area at one end of the label;

a light, fine pattern of the same permanent pressure-sensitive adhesive on a second area of said label, and constituting means for sealing and resealing said second portion of said label, said fine coverage area including discontinuous fine areas of said permanent adhesive which are so small as to permit sealing and unsealing of said label without impairing the integrity of the label despite the permanent nature of the adhesive;

said label having an adhesive-free area at the opposite end of said label from said first area for gripping said label to peel it back; and

said permanent adhesive having a peel force of at least three pounds per inch.

13. A labelling product comprising:

a backing strip formed of flexible sheet material;

a release coating on said backing strip;

a plurality of separate labels each having a permanent pressure-sensitive adhesive coating thereon, mounted on said backing strip with the adhesive material in engagement with the release coating;

said pressure-sensitive adhesive material being in a fine pattern including bare areas and adhesive coated areas forming said fine pattern in at least one area of said label, wherein said fine pattern has no substantial areas of adhesive which are more than one-eighth inch square, and wherein said label has varying percentage coverage of adhesive over its surface, including an area having a heavier percentage covering of adhesive and an area having a lighter percentage covering of adhesive;

all of said adhesive on said labelling product being of the same permanent pressure-sensitive adhesive;

said labelling product including means for providing an area unsecured by the area having a heavier percentage coverage for readily permitting peeling and resealing of said labels in the area having a lighter percentage coverage, of said varying percentage coverage of adhesive, said fine coverage area including discontinuous fine areas of said permanent adhesive which are so small as to permit sealing and unsealing of said label without impairing the integrity of the label despite the permanent nature of the adhesive; and

said permanent adhesive having a peel force of at least three pounds per inch.

4,889,235

STACKING AND SURFACE PROTECTION DEVICE ON A PROTECTIVE HOUSING MADE OF A SYNTHETIC MATERIAL

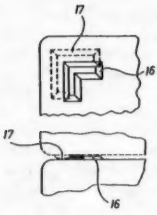
Joachim Hess, Schroeplerstrasse 35, D-8070 Ingolstadt, Fed. Rep. of Germany

Filed Feb. 4, 1988, Ser. No. 152,048

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1987, 3704016

Int. Cl.[4] B65D *21/02*

U.S. Cl. 206—511 **11 Claims**



1. A stacking and surface protection device on a protective housing made of a synthetic material of the type having at least two parallel opposing outer surfaces, wherein the improvement comprises:

four raised supports carried adjacent the corners on each of said outer surfaces which serve as supporting feet, said raised supports forming a rectangle in such a manner that two diagonally opposed raised supports constitute alternate outer and inner contact surfaces with respect to the rectangle,

contact surfaces formed on said raised supports in such a manner that interlocking pairs consisting of two raised supports on opposite ones of said outer surfaces of stacked housings are defined which constitute first and second elements when two of said housings are stacked, and

said first and second elements interlocking when a rotation of 180 degrees takes place around a vertical or a horizontal axis to lock superposed contact surfaces of said housings together in two degrees of freedom of the stacking plane serving as antislipping devices.

4,889,236

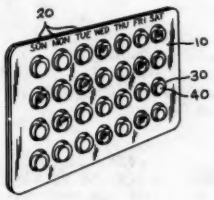
CREDIT CARD-STYLE MEDICATION PACKAGE

Ralph Bartell, Lincoln Park; Roger Boissonneault, Long Valley, and Monica Blischok, Linden, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Feb. 26, 1988, Ser. No. 160,977

Int. Cl.[4] B65D *83/04, 85/56*

U.S. Cl. 206—531 **1 Claim**



1. A credit card-style medication package comprising a tripartite structure having

(a) an upper portion comprising a rigid sheet of polyvinyl chloride having

a thickness of between about 0.020 inches (0.51 mm) and about 0.040 inches (1.02 mm),

peripheral dimensions of approximately 3⅜ inches (86 mm) by 2⅛ inches (53.98 mm),

top and bottom surfaces,

a plurality of spaced apart apertures, and calender indicia protected by a clear laminated surface layer;

(b) a middle portion comprising a sheet of clear polyvinyl chloride having

a thickness between about 0.005 inches (0.127 mm) and 0.015 inches (0.381 mm),

substantially the same peripheral dimensions of said upper portion,

top and bottom surfaces, and

a plurality of pockets formed therein for containing unit doses of medication, at least a portion of said pockets containing medication in unit dosage form, said plurality of pockets so spaced and sized as to pass upward through said plurality of spaced apart apertures in said upper portion,

the top surface of said middle portion being firmly sealed to the bottom surface of said upper portion; and

(c) a lower portion comprising a sheet of metal foil having

a thickness of between about 0.001 inches (0.025 mm) and 0.005 inches (0.13 mm),

substantially the same peripheral dimensions as said middle portion, top and bottom surfaces,

the top surface of said lower portion sealed to the bottom surface of said middle portion to protect said medication and optionally said credit card-style medication package further including a soft, pliable pouch having a foldable cover flap for enclosing and containing said package.

4,889,237

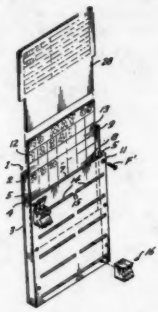
PILL CONTAINER CALENDAR

Phillip J. Brandon, 3207 Hoyt Ave. #3, Everett, Wash. 98201

Filed Jul. 27, 1988, Ser. No. 224,957

Int. Cl.[4] B65D *85/56*

U.S. Cl. 206—534 **17 Claims**



1. A pill dispenser comprising a calendar including an insert calendar sheet and a substantially rigid holder for said calendar sheet, said holder including a substantially planar front panel, and several separate reusable containers each manually attachable to and detachable from said holder.

4,889,238

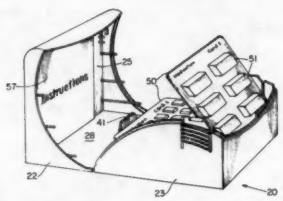
MEDICAMENT PACKAGE FOR INCREASING COMPLIANCE WITH COMPLEX THERAPEUTIC REGIMENS

Jay A. Batchelor, Norwich, N.Y., assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Apr. 3, 1989, Ser. No. 332,687

Int. Cl.[4] B65D *83/04*

U.S. Cl. 206—535 **8 Claims**



1. A medicament package for improving compliance with a therapeutic regimen wherein a plurality of medicaments are to be administered to a patient in a prescribed sequence and in accordance with specified intervals, said package comprising:

(a) a multiplicity of blister cards of generally uniform planar dimensions, said medicaments being carried by said blister cards in sequential order on the individual cards and from card-to-card, said blister cards being placed in stacked array with the principal dimensions thereof oriented generally horizontally and arranged in order of card use, with the first to be used topmost;

(b) a base which houses the stack of blister cards, said base being adapted to support said stack vertically and having means therein to provide lateral support to maintain vertical alignment of the edges of the blister cards comprising the stack, said base permitting direct and unobstructed access to the uppermost blister card of the stack and limited access, only, to the edges of said blister cards; and

(c) a lid adapted to cover said base and movable to an open position whereby access to said uppermost blister card is provided.

4,889,239

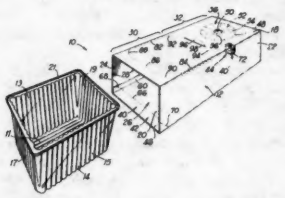
FOOD AND BEVERAGE CUP PACKAGE

George R. Sandish, Annapolis, Md., and Henry Wischusen, III, Lilburn, Ga.

Filed Aug. 25, 1983, Ser. No. 526,319

Int. Cl.[4] B65D *5/54*

U.S. Cl. 206—611 **21 Claims**



1. A disposable package for holding food and a beverage cup comprising:

(a) a paperboard sleeve comprising a top panel, a bottom panel and a pair of side panels defining an elongated enclosure of rectangular cross-section extending therethrough between a pair of opposite ends of said sleeve, at least one of said sleeve ends defining a rectangular opening into said enclosure, said sleeve including a tub holding first portion and a separate cup holding second portion;

(b) a tub, adapted to hold a quantity of food, positioned in said enclosure in said first portion of said sleeve, said tub comprising a bottom wall, a pair of sidewalls and a pair of end walls, the height and width of said tub being such that said tub can be slid into said enclosure through said rectangular opening and also being such that said tub contacts the inside surfaces of each of said top, bottom and side panels of said sleeve for adding rigidity to said sleeve;

(c) stop means for maintaining said tub in said first portion of said sleeve;

(d) cup receiving aperture means located in said top panel of said sleeve in said second portion of said sleeve for cooperating with said bottom panel of said sleeve for holding a beverage cup, said stop means preventing said tub from moving underneath said cup receiving aperture means for preventing said tub from interfering with the insertion of a cup into said cup receiving aperture means; and

(e) tear away panel means in said top panel of said sleeve confined to first portion thereof and overlying said tub for providing access to said tub but not overlying said cup receiving aperture means.

17. A method for holding food and a beverage cup comprising the steps of:

(a) providing a paperboard sleeve comprising a top panel, a bottom panel, and a pair of side panels defining an elongated enclosure of rectangular cross-section extending therethrough between a pair of opposite ends of said sleeve,

(b) providing a rectangular opening into said enclosure through at least one of said sleeve ends;

(c) inserting an open top food tub into said enclosure through said rectangular opening such that said tub

contacts the inside surfaces of each said top, bottom and side panels of said sleeve for adding rigidity to such sleeve;

(d) maintaining said tub in a tub holding first portion of said sleeve;

(e) inserting a beverage cup having a height less than twice the height of said sleeve into a cup receiving aperture located in said top panel of said sleeve in a cup holding second portion of said sleeve, and moving said cup down into contact with said bottom panel of said sleeve for maintaining said cup in a stable condition; and

(f) providing access to said tub by removing a tear away panel in said top panel of said sleeve overlying said tub.

4,889,240

BILL HANDLING APPARATUS HAVING RIGHT AND LEFT BILL-SHIFTING MECHANISMS

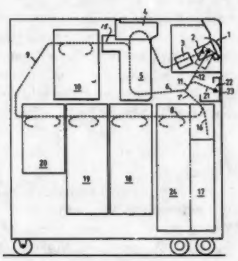
Koichi Sato, and Tsutomu Sawa, both of Fujisawa, Japan, assignors to International Business Machines, Armonk, N.Y.

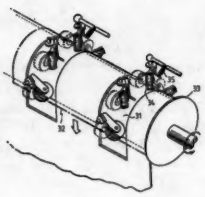
Filed Sep. 14, 1988, Ser. No. 244,696

Claims priority, application Japan, Nov. 20, 1987, 62-292259

Int. Cl.[4] B07C *5/00, 5/36*

U.S. Cl. 209—534 **7 Claims**





1. A bill handling apparatus comprising:

a holder mechanism for receiving and holding bills supplied thereto;

a feeder mechanism for receiving bills from said holder mechanism and feeding them out one by one over a feed path in a feed direction;

a transfer mechanism for transferring bills from said holder mechanism to said feeder mechanism;

a shifting mechanism for shifting bills fed from said feeder mechanism to one side of said feed path;

an inverse shifting mechanism for inversely shifting the bills to be transferred by said transfer mechanism, by moving them to a side of said feed path opposite to said one side by a predetermined distance; and

a discriminator mechanism for discriminating whether the bills shifted by said shifting mechanism are true or false.

4,889,241

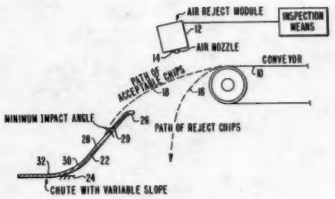
DISCHARGE CHUTE WITH VARIABLE SLOPE BOTTOM FOR FRAGILE ARTICLE SORTING SYSTEM

Kevin C. Cogan, Carrollton, and Robert M. Echols, Copper Canyon, both of Tex., assignors to Frito-Lay, Inc., Dallas, Tex.

Filed Nov. 30, 1987, Ser. No. 126,728

Int. Cl.[4] B07C *5/342*

U.S. Cl. 209—552 **5 Claims**



1. In combination with a sorting machine for sorting lightweight fragile items having a large surface area, a sorting machine having an inspection conveyor travelling at a high speed on which items are inspected by inspection means and then thrown from the end of the conveyor into space, air nozzle rejected item selection means for separation of acceptable items from rejected items operative from the inspection means to direct a blast of air against rejected items to change their trajectory after being ejected from the end of the inspection conveyor, with improved receiving means for receiving acceptable items to minimize breakage and to decelerate the speed of the acceptable items, the receiving means comprising:

(a) a stationary chute having a generally "S" shape with a variable slope between the top and the lower portion of the "S",

(b) means supporting the chute spaced from and below the end of the conveyor so as to be in the trajectory of acceptable items and out of the trajectory of rejected items,

(c) means positioning the cute so that an intermediate portion of the variable slope presents a minimum impact angle to the path of acceptable items,

(d) the lower portion of the bottom of the "S"-shaped chute shaped in a generally horizontal line to allow efficient removal of the accepted items.

4,889,242

DEVICE FOR TESTING AND SORTING ELECTRONIC COMPONENTS, MORE PARTICULARLY INTEGRATED CIRCUIT CHIPS

Hans H. Willberg, Munich, and Ekkehard Ueberreiter, Raubling, both of Fed. Rep. of Germany, assignors to Multitest Elektronische Systeme, Fed. Rep. of Germany

Filed May 28, 1986, Ser. No. 868,290

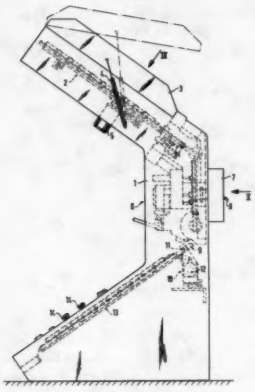
Claims priority, application Fed. Rep. of Germany, Jun. 4, 1985, 3520031; Aug. 30, 1985, 3531143; Aug. 30, 1985, 3531119; Aug. 30, 1985, 3531120; Aug. 30, 1985, 3531142

Int. Cl.[4] B07C *5/344*

U.S. Cl. 209—573 **17 Claims**

1. A device for testing and sorting electronic components, and more particularly integrated circuit chips, having an input magazine for untested components and an output magazine for tested components, at least one of which magazines has, for the components, a flat base plate, a plurality of parallel magazine channels arranged on a gradient with T-shaped guide rails forming limits of the magazine channels and nesting with their vertical limbs upon the base plate, means for mounting the guide rails such that they limit the magazine channels at the side, means for connecting the guide rails with each other to form a block which, as a whole, is capable of being exchanged and, a plurality of annular brake rollers protruding through the

gap formed by adjacent T-shaped cross-sectional guide rails, said brake rollers suspended on carrier rods which run transverse to the direction of transportation of the components, such that the internal diameter of the inner brake rollers is



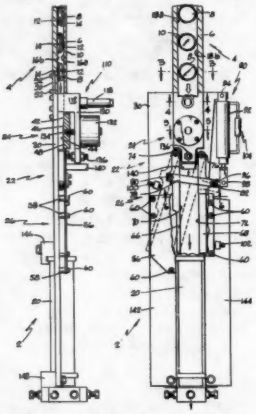
substantially greater than the diameter of the carrier rods and such that the brake rollers sit on the base plate and may be lifted by components slipping down in the magazine channels, thereby reducing the components' slipping speed.

4,889,243

APPARATUS FOR DETECTING AND EJECTING BENT CROWNS

Larry M. Dugan, Boulder, Colo., assignor to Adolph Coors Company, Golden, Colo.

Filed Jun. 13, 1988, Ser. No. 205,934
Int. Cl.[4] B07C 5/06
U.S. Cl. 209—626 **19 Claims**



1. A conveying system for crowns used to cap containers having a portion thereof adapted to detect and eject bent crowns comprising:

first conveyor means for permitting the passage therethrough of a plurality of crowns in successive order, each of said crowns having an upper surface and a lower edge;

said first conveyor means having a cross-sectional configuration formed by a first pair of fixed opposite wall members having generally planar facing surfaces which are parallel to each other and a second pair of fixed opposite wall members having generally planar facing surfaces which are parallel to each other, said cross-sectional configuration permitting passage therethrough of bent and unbent crowns;

said crowns and said first and second pairs of opposite wall members being dimensioned so that said crowns pass through said first conveyor means with said upper surfaces of said crowns generally parallel to said facing surfaces of said first pair of opposite wall members;

second conveyor means having an upstream end for receiving unbent crowns passing through said conveying system and for permitting the passage therethrough of a plurality of unbent crowns in successive order;

said first conveyor means having a downstream end spaced from said upstream end of said second conveyor means;

a transfer system located between said downstream end and said upstream end and having a passageway extending therethrough for permitting movement of said crowns therethrough so as to enable transfer of said crowns between said first conveyor means and said second conveyor means;

bent crown detecting means comprising a part of said transfer system for detecting the presence of a bent crown;

movable bent crown ejecting means located downstream from said bent crown detecting means comprising a part of said transfer system for movement, in response to a signal, between a first position permitting movement of said crowns through said movable bent crown ejection means to said second conveyor means and a second position for ejecting a bent crown from said transfer system so that said bent crown will not be transferred to said second conveyor means;

said movable bent crown ejecting means normally being in said first position;

said bent crown detecting means having movable stopping means for movement, in response to a signal, between a first position stopping the movement of a bent crown through said bent crown detecting means and a second position permitting movement of said bent crown through said bent crown detecting means to said movable bent crown ejecting means; and

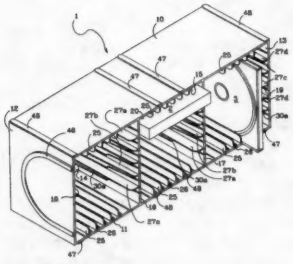
said movable stopping means normally being in said first position.

4,889,244

STORAGE CONTAINER FOR AUDIO CASSETTE TAPE BOXES AND DIGITAL AUDIO COMPACT DISC BOXES

Bruce A. Hehn, Mass, and James K. Sankey, Hudson, both of Ohio, assignors to Alpha Enterprises, Inc., Canton, Ohio

Filed Aug. 18, 1988, Ser. No. 233,462
Int. Cl.[4] A47F 7/00
U.S. Cl. 211—41 **13 Claims**



1. A storage container construction for audio cassette tape boxes and digital audio compact disc boxes, said storage container being an integral one-piece member and including:

(a) spaced, parallel top and bottom walls, a pair of spaced, parallel sidewalls, and an open front providing access into the container;

(b) a pair of spaced, parallel partition walls parallel to the sidewalls and equally dividing the storage container into a pair of outer compartments and a center compartment;

(c) a plurality of spaced, parallel elongated first ribs extending inwardly of at least one of the top and bottom walls into the container compartments, said first ribs being parallel to the sidewalls and partition walls;

(d) a plurality of spaced, parallel elongated second ribs extending inwardly of the pairs of sidewalls and partition walls into the container compartments, said second ribs each being parallel to the top and bottom walls and aligned with a respective one of the second ribs of the opposite sidewall or partition wall;

(e) a plurality of spaced, parallel elongated third ribs extending inwardly of the pairs of sidewalls and partition walls into the container compartments, at least one of said third ribs being located between each adjacent pair of the second ribs and further between the top and bottom walls and each of said second ribs adjacent thereto, said third ribs being parallel to the second ribs and having a step formed thereon for predetermining the distance of insertion of a cassette tape box into the storage container; and

(f) stop means formed adjacent a rear end of the storage container for predetermining the distance of insertion of a compact disc box into said storage container.

4,889,245

POP CAN TRANSPORT DEVICE

Richard A. Rinke, 737 Charlesina St., Rochester, Mich. 48065

Filed Dec. 19, 1988, Ser. No. 286,615
Int. Cl.[4] B65D *65/00*
U.S. Cl. 211—49.1 **8 Claims**

1. A modular pop can transport device comprising:

a pair of laterally interconnected first and second symmetrical sections;

each section including an elongated flat web extending longitudinally;

an integral elongated transverse partition extending perpendicularly from opposite sides of said web centrally thereof;

opposed pairs of aligned, elongated, transversely concave end wall sections extending from the ends of said web upon its opposite sides, defining with said partition and said web a plurality of elongated open-ended tubes, with each tube having an elongated, throated, expansive opening along its length, each of said end wall sections having a first portion extending from said web and longitudinally away from said partitions, a second portion extending from said first portion at a first corner and perpendicular to said web, and a third portion extending from said second portion at a second corner and longitudinally towards said partition, said corners defining angles;

each tube adapted to receive and retain a stack of pop cans; and

can stop means connected to one end of said partition and extending into each tube;

said end wall sections being relatively yieldable in comparison to said partition, such that said end tubes are yieldable outwardly away from said partitions to allow a pop can within any one of said tubes to be removed without removing any other pop can stacked therewith; and

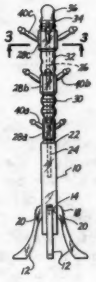
said first and second symmetrical sections being connected to each other at respective ones of said second portions and by a handle centrally overlying said first and second sections and connected thereto, said stop means including a stop plate underlying said web and partition; spaced pairs or opposed aligned mount flanges upon said stop plate extending over the one ends of said partition and secured thereto.

4,889,246

ROTATING CLOTHES TREE

Kil J. Lee, 508 Crocker Ave., Pacific Grove, Calif. 93950

Continuation-in-part of Ser. No. 227,084, Aug. 1, 1988, which is a continuation-in-part of Ser. No. 48,324, May 11, 1987, abandoned. This application Mar. 2, 1989, Ser. No. 317,844
Int. Cl.[4] A47F *5/02*
U.S. Cl. 211—163 **8 Claims**



1. A clothes stand comprising:

(a) a base member, said member being at least partially axially orificed, from its top downwardly, said base member including means to support said base member on a horizontal surface with the axis of said orifice in a substantially vertical orientation;

(b) a cylindrical axle rod, said rod having a portion of a configuration to fit into the orifice in said base member, and being inserted therein;

(c) a plurality of spool-like elements disposed in series on said axle rod, each of said spool-like elements having an internal diameter slightly greater than the external diameter of said axle rod, thereby being rotatable about said axle rod, and each of said spool-like elements being rotatable independently of the others;

(d) a spacer sleeve member interposed between at least two of said spool-like elements;

(e) at least one support arm longitudinally extending angularly upwardly from each of said spool-like elements to support a coat or other garment therefrom; and

(f) each spool-like element above the lowermost said element being of a greater outside diameter than that immediately below it, and each support arm extending from the spool-like element above the lowermost such element, being of a greater longitudinal dimension that that of any of the arms extending from the spool-like element immediately below

whereby garments on the several support arms on the different spool-like elements may be rotated about said axis for different angular dispositions relative to said rod,

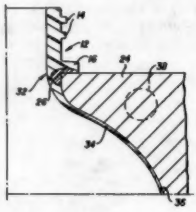
and garments hung on the upper support arms will not hang on the same vertical line as the garments hung on the lower support arms, thereby permitting garments hung on the support arm of any spool-like element to be rotated about the axle rod in a different concentric cylindrical path from that defined by the rotation of garments hung on the support arms of any other spool-like element.

4,889,247

PLASTIC CONTAINER, PREFORM FOR AND METHOD OF MAKING SAME

Wayne N. Collette, Merrimack, and Suppayan M. Krishnakumar, Nashua, both of N.H., assignors to Continental PET Technologies, Inc., Norwalk, Conn.

Filed Sep. 16, 1988, Ser. No. 245,374
Int. Cl.[4] B65D *1/02, 23/00*; B29C *49/08, 49/64*
U.S. Cl. 215—1 C 16 Claims



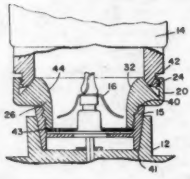
7. A hollow blow molded plastic container comprising an unoriented and uncrystallized neck portion, a biaxially oriented body portion, a biaxially oriented shoulder portion between said neck portion and said body portion, and said shoulder portion immediately adjacent said neck portion having an unoriented annular part of a different strength than an adjacent part of said shoulder portion whereby perpendicularity of said neck portion relative to said body portion is assured.

4,889,248

COMBINATION CONTAINER CAP AND BLENDER ADAPTER

James R. Bennett, Fort Lauderdale, Fla., assignor to Thermo Blender Inc., Sebastian, Fla.

Filed Feb. 4, 1988, Ser. No. 152,174
Int. Cl.[4] B65D *51/24*
U.S. Cl. 215—100 R 9 Claims



1. A combination container cap and blender adapter, for facilitating the interconnection of a standard commercially available insulated container of the THERMOS type and a standard commercially available blender, said blender including a mounting attachment which allows the blender base to receive a special blender container in readily removable engagement, said blender also including rotary cutting blades which are removably positioned within said mounting attachment, said combination cap and blender adapter comprising:

cap means for threaded, readily removable engagement with said container said cap means having a generally circular configuration including a top and annular sides, said annular sides including internal threads, said cap means further including external thread means for threaded, readily removable engagement with said mounting attachment, said external thread means having a smaller diameter than said internal threads and defining an interior opening, said cap and blender adapter being an integrally molded unit, said cap and blender adapter including sealing means for providing a liquid impermeable barrier between said mounting attachment, said cap and blender adapter, and said container;

interfacing means positioned within said cap means, for physically aligning said standard container with said cap means to facilitate said threaded engagement;

said interfacing means integrally associated with said cap means and said internal thread means interior opening;

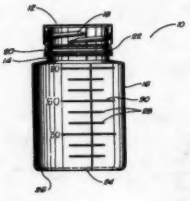
whereby said cap and blender adapter allows a user to interface a standard insulated container of the THERMOS type having threads incompatible with said blender mounting attachment to said standard blender and directly mix or process the contents therein without the requirement of intervening utensils or special blending containers.

4,889,249

URINE BOTTLE WITH CAP

Walter C. Hulon, P.O. Box 40745, Baton Rouge, La. 70835

Filed Jun. 30, 1988, Ser. No. 213,710
Int. Cl.[4] B65D *41/34*
U.S. Cl. 215—230 17 Claims



1. A urine bottle comprising:

a body having a closed bottom portion;

a neck portion integrally formed with said body, said neck portion having an outwardly formed ring having a flat lower edge, said neck portion having an exterior thread formed above said ring, said neck portion defining the mouth of said bottle, said mouth opening to the interior of said body; and

a cap threadedly connected to said exterior thread of said neck portion, said cap forming a liquid-tight seal against said mouth, said cap having a serialized code integrally formed into the top surface of said cap, said cap having a detachable collar formed at the bottom of said cap, said detachable collar separating from said cap upon the removal of said cap from said neck portion.

4,889,250

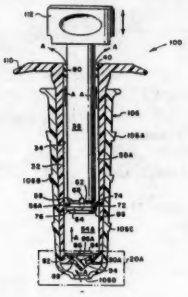
VACUUM PUMP AND CLOSURE ASSEMBLY FOR BEVERAGE CONTAINER

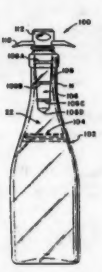
Michael B. Beyer, Garland, Tex., assignor to E Street Enterprises, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 142,449, Jan. 11, 1988, abandoned, which is a division of Ser. No. 929,591, Nov. 12, 1986, Pat. No. 4,723,670, which is a continuation-in-part of Ser. No. 828,542, Feb. 12, 1986, abandoned. This application Jun. 30, 1988, Ser. No. 213,585

Int. Cl.[4] B65D *51/24*

U.S. Cl. 215—228 **9 Claims**





1. A pump and closure assembly for depressurizing the interior open space within a beverage container comprising:

a closure member;

a pump having a housing attached to said closure member, said pump housing having a cylindrical bore and a piston mounted for extension and retraction through said bore;

an annular seal mounted on said piston, said annular seal engaging said bore and defining the boundary of an evacuation chamber within said bore on one side of said annular seal and an air transfer annulus being defined between the piston and the pump cylinder bore on the other side of the seal;

valve means coupled to said piston for connecting and disconnecting said evacuation chamber in fluid communication with said air transfer annulus in response to reciprocal movement of said piston;

a check valve coupled to said pump housing, said check valve having a transfer port in communication with said evacuation chamber and a movable valve element for covering and uncovering said transfer port;

said pump housing having a portion defining a pocket in which said transfer port is formed and in which said movable valve element is received, said movable valve element comprising a flexible member coupled to said housing, said flexible member overlying said transfer port; and,

said pocket portion defining a conical valve seating surface within said pocket, and said transfer port comprising a bore intersecting said web and said conical seating surface.

4,889,251

CORK STOPPER FOR BOTTLES OF WINE

David E. Hojnoski, P.O. Box 412, Smithville Ontario, Canada

Filed Jul. 28, 1988, Ser. No. 225,723

Int. Cl.[4] B65D *39/16*

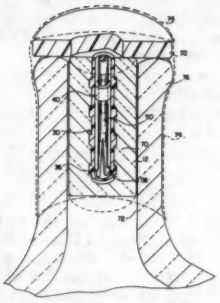
U.S. Cl. 215—296 **10 Claims**

1. Stopper apparatus for wine bottles and the like comprising:

cylindrical cork means having a top surface, a closed bottom, and annular side wall, a cylindrical well in said cork means concentric with the annular side wall and having a bottom;

a unitary plastic, generally cylindrical shaped, insert within said well, said insert having an open top generally planar with the top surface of said cork and a closed bottom adjacent the bottom of said well, said cylindrical insert having a closed annular side wall with a plurality of interference means longitudinally spaced about the exterior thereof, said insert having restriction means therein associated with an inner wall and spaced a predetermined distance from said insert bottom, said restriction means being of a predetermined diametric extent;

the diametric extent of said insert including said interference means being substantially the same as the diameter of said well whereby said insert can be presassembled with said cork means without inducing any substantial stress in said cork means;



puller means having a cap portion and integral shank portion, a free end of said shank portion having means for cooperation with said restriction means, the diametric extent of said shank portion and said restriction means such that said shank portion is moveable within said restriction means;

whereby, when said side wall of said cork is radially compressed, an interference fit is generated between the cork and said insert interference means such that the cork may be removed from a bottle when in operative association therewith by pulling on the puller cap means and the shank end is in cooperative engagement with said restriction means.

4,889,252

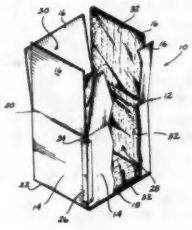
INSULATED CONTAINER

John W. Rockom, Seattle, and Charles A. Collier, Bellevue, both of Wash., assignors to Allpak Container, Inc., Tukwila, Wash.

Filed Nov. 18, 1988, Ser. No. 273,272

Int. Cl.[4] B65D *5/56*

U.S. Cl. 220—3.1 **2 Claims**



1. An insulated container, comprising one or more walls having an interior surface, and an insulation means bonded to the interior surface of the one or more walls, the insulation means including at least one layer of flexible material having bubbles of air entrapped therein to provide a soft cushion and

thermal insulation and further wherein the layer of flexible material is sandwiched between one or more layers of reflective foil.

2. An insulated container, comprising:

a plurality of side panels, each of the side panels having an interior surface and an exterior surface;

at least one top panel interconnected with one or more of the side panels, each of the at least one top panel having an interior surface and an exterior surface;

at least one bottom panel interconnected with one or more of the side panels, each of the at least one bottom panel having an interior surface and an exterior surface; and

means for providing thermal insulation, the insulation means being formed of flexible material having at least one layer of air bubbles entrapped therein, the insulation means being bonded to the inside surface of the plurality of side panels and the inside surface of the at least one top panel and to the inside surface of the at least one bottom panel and further wherein the insulation means comprises a layer of reflective foil bonded to each side of the layer of flexible material.

4,889,253

DIVIDER FOR LUGGAGE AND THE LIKE

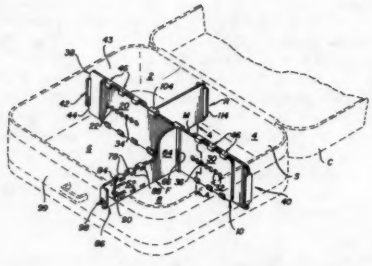
Marius Schmulian, Drokford House, Charles Rd., St. Leonards, Sussex, and David A. Lake, 11 Churchwood Way, St. Leonards, East Sussex, both of United Kingdom

Filed Feb. 17, 1988, Ser. No. 156,623

Claims priority, application United Kingdom, Feb. 20, 1987, 8704042; Feb. 24, 1987, 8704331; Apr. 9, 1987, 8708509

Int. Cl.[4] B65D *1/24*

U.S. Cl. 220—22.1 **2 Claims**



1. A divider for luggage, comprising:

(a) a central support member;

(b) two extension members which slide at the ends of said support member and substantially coplanar therewith;

(c) said extension members having a combined length substantially less than the length of said support member and secured to said support member and removable from the ends thereof by hook means at top and bottom to prevent vertical disengagement from said support member;

(d) said extension members each including a stop at one end thereof engageable with an end of said support member and each having an inside end spaced a substantial distance from its respective stop;

(e) said inside ends of said extension members defining an unobstructed space on said support member when mounted thereon and having said stops engaging with the corresponding ends thereof;

(f) a pair of transversely extending normally unremovable subdividers slidably mounted in said unobstructed space and only movable therein relative to each other and between said inside ends of said extension members so that each sub-divider at all times provides a barrier with said support member when positioned in the luggage and dividing the luggage with four compartments of substantial area;

(g) said sub-dividers each including means engaging the top and bottom of said support member to prevent vertical disengagement therefrom;

(h) said sub-dividers being disengageable only when at least one of said extension members is removed from said support member;

(i) said support member including a plurality of holes disposed adjacent each end thereof; and

(j) said extension members each including a projection selectively received in one of said holes to thereby secure said extension members on said support member at a selected position.

4,889,254

BOXES FOR PACKAGING OR STORAGE OF VARIOUS OBJECTS

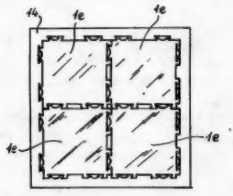
Jean-Jacques Vola, Verrieres-Le-Buisson, France, assignor to Cosmetic Production, Paris, France

Filed Oct. 26, 1988, Ser. No. 262,716

Claims priority, application France, Oct. 27, 1987, 87 14803; May 26, 1988, 88 07001

Int. Cl.[4] B65D *25/20*

U.S. Cl. 220—23.4 **2 Claims**



1. Boxes of molded plastic material for packaging or storage of various objects, said boxes having a polygonal cross-section with two opposite faces of which one is closed and the other comprises a closure lid, two series of complementary male and female assembly guides on the external sides of said boxes between said opposite faces, the guides of one of said series being provided with a stop at one end for the guides of the other series and the arrangement being such that a variable number of boxes of this type can thus be assembled in side-by-side relation, and a frame of polygonal contour surrounding a plurality of said boxes assembled together in side-by-side relation, said frame having internal walls having guides adapted to be assembled with said guides on the external sides of the boxes, the frame being thus adapted to form a single-unit assembly with the boxes which are placed within said frame.

4,889,255

DEVICE SUITABLE FOR USE AS A PLASTIC CAN

Wolfram Schiemann, Eugen-Nagele-Strasse 17, 7140 Ludwigsburg, Fed. Rep. of Germany

Filed Oct. 3, 1988, Ser. No. 252,529

Int. Cl.[4] B65D *11/00*

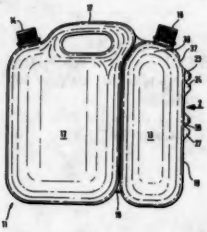
U.S. Cl. 220—83 **15 Claims**

1. Device suitable for use as a multi-chambered plastic can, being essentially symmetrical to a plane separating two mold halves, said device having a frontal face and an outer wall through which said separation plane runs, wherein:

(a) at least two projections are provided on one side of said separation plane, and at least one projection is provided on the other side of said separation plane;

(b) viewed along the perpendicular to said separation plane, said projections are set off from one another so as not to overlap; and

(c) said projections are positioned on said frontal face of said can, face said separation plane and extend from said outer wall said projections being adapted to hold a tool therebetween.



4,889,256

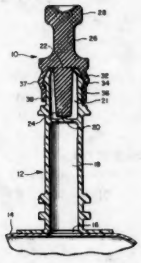
PORT AND ELASTIC CLOSURE

Thomas A. Fowles, McHenry, Ill., assignor to Baxter International Inc., Deerfield, Ill.

Continuation of Ser. No. 670,852, Nov. 13, 1984, abandoned. This application Mar. 4, 1986, Ser. No. 837,664

Int. Cl.[4] B65D *41/20*

U.S. Cl. 220—306 19 Claims



1. A removable elastic closure for sealing the end of a tubular port comprising:

an elongated top member;

a guide member, the top member and guide member defining an inner bore;

a sleeve member surrounding the guide member having in an unstressed condition an inner circumference that is less than the outer circumference of a top portion of the tubular port;

the sleeve member and outer portion of the tubular port cooperating to produce an audible signal when the elastic closure is removed from the tubular port; and

the guide member and inner bore cooperating to provide means for hampering the reinsertion of the elastic closure into the tubular port.

4,889,257

CONTAINER WITH MULTIPLE POSITION LID

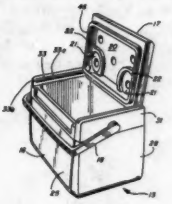
William J. Steffes, Wichita, Kans., assignor to Coleman Outdoor Products, Inc., Wichita, Kans.

Filed Jun. 16, 1988, Ser. No. 207,714

Int. Cl.[4] B65D *43/14*

U.S. Cl. 220—331 12 Claims

1. A cooler container comprising a container body having a top opening and a movable lid for opening and closing the top opening, the container body including insulating material and having front and back walls and a pair of side walls, each of the side walls having a slot extending between the front and back walls, the lid having top and bottom surfaces and a pair of side surfaces and a pin extending laterally outwardly from each of the side surfaces, each of the pins extending into one of the slots in the side walls whereby the pins can rotate within the slots so that either the top surface or the bottom surface of the lid can face upwardly from the container body, said container body including handle means for carrying said container.



4,889,258

BLAST-RESISTANT CONTAINER

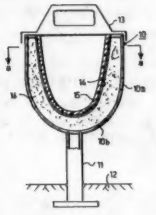
Yaakov Yerushalmi, Petah Tikva, Israel, assignor to Koor Metals Ltd., Holon, Israel

Filed Jun. 30, 1988, Ser. No. 213,569

Claims priority, application Israel, Jul. 16, 1987, 83209

Int. Cl.[4] F42B *1/02*

U.S. Cl. 220—429 18 Claims



1. A blast-resistant container for receiving an explosive or explosive-suspect article comprising a high-strength outer housing; characterized in that the housing includes an inner compressible layer of a mixture including vermiculite in a binder, effective to space the article from the outer housing, to absorb energy of the blast before transmitted to the outer housing, to distribute the blast forces over a larger surface area of the outer housing, and to impart resistance to the penetration of fragments to the outer housing.

4,889,259

APPARATUS FOR INJECTING BALLS INTO A WELL

Dan E. Lowrance, Fort Worth; Donald L. Douglas, Stephenville, and David W. Merryfield, Mansfield, all of Tex., assignors to Special Projects Manufacturing Inc., Ft. Worth, Tex.

Continuation-in-part of Ser. No. 926,182, Nov. 3, 1986, Pat. No. 4,759,469. This application Jul. 19, 1988, Ser. No. 221,334

The portion of the term of this patent subsequent to Jul. 26, 2005, has been disclaimed.

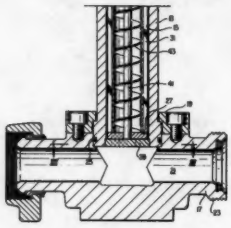
Int. Cl.[4] B65G *29/00*

U.S. Cl. 221—75 8 Claims

1. An apparatus for dispensing balls into a well conduit, comprising:

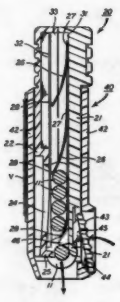
a housing having a cylindrical inner surface;

means for connecting the housing to the well conduit;
a subassembly having an upper support and a lower support connected together by a plurality of vertical guide members spaced apart from and parallel to each other;
the subassembly including a shaft having a lower end rotatably engaging the lower support and an upper end extending rotatably through a hole provided in the upper support, the shaft being parallel to the guide members;
a helical flight rigidly mounted to the shaft for receiving a plurality of balls, the distance between the inner surfaces of the guide members and the outer surface of the shaft



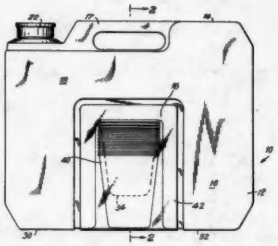
being less than the diameter of the balls, so that the balls cannot roll down the flight;
rotation means engagable with the subassembly for rotating the guide members and the shaft relative to each other to move the balls downward on the flight;
the lower support having a plurality of apertures, each sized to allow one of the balls to pass through as the flight and lower support rotate relative to each other; and
the subassembly being removable as a unit from the housing for placing balls on the flight and insertable into the housing for dispensing the balls into the well conduit.

4,889,260
GOLF TEE DISPENSER
Henry O. Zeller, Box 13436, Rochester, N.Y. 14613
Filed Aug. 8, 1988, Ser. No. 229,303
Int. Cl.[4] B65D *83/02*
U.S. Cl. 221—197 **9 Claims**



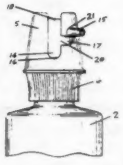
7. A tee pack for removable insertion in a support housing of a golf tee dispenser, said tee pack including:
front and back walls forming an open-bottom vertical passage for a stack of horizontal golf tees;
a horizontal internal shelf resiliently movable between a closed position in said passage for supporting said stack, and an open position out of said passage for releasing the lowermost of said tees through the open bottom of said tee pack; and
a floppy compliant check flap depending from one of said walls to engage the shanks of said tees and extending inwardly of said passage between said lowermost tee and the next tee thereabove to permit free movement of said tees by their own weight toward said open bottom and to obstruct other movement of said tees within said tee pack.

4,889,261
BEVERAGE CONTAINER AND DISPENSER
George R. Conrad, Dunwoody, Ga., assignor to General Electric Company, Mt. Vernon, Ind.
Filed Jun. 8, 1988, Ser. No. 203,832
Int. Cl.[4] B67D *5/60*
U.S. Cl. 222—130 **7 Claims**



1. An assembly for the containment and dispensing of a beverage, which comprises;
(A) a hollow body of pressure deformable, synthetic polymeric resin, said body having
1. a first closed end;
2. a second closed end;
3. a continuous body skin joining the first and second ends, said skin being defined by and intermediate of an inner skin surface and an outer skin surface; and
4. a projected portion of the skin,
restricted to a selected site on the body;
(B) a single closed chamber defined by the inner surface of the skin including the projected portion, for containment of the beverage;
(C) a port through the skin, providing fluid communication between the chamber and the outer surface of the skin;
(D) removable closure means mounted in the port, for opening and closing the fluid communication; and
(E) a drinking vessel removably mounted on the outer skin surface of the projected portion of the skin.

4,889,262
LOCKING SYSTEM FOR PUMP DISPENSER
Ray A. Toms, Atlantic Highlands, N.J., assignor to L'Oreal, S. A., Paris, France
Filed Jun. 7, 1988, Ser. No. 203,277
Int. Cl.[4] B67D *5/32*
U.S. Cl. 222—153 **4 Claims**



1. In a hand held liquid dispenser comprising a container for liquid to be dispensed, a container cap mounted on the container, a hollow vertically reciprocable plunger mounted on

the container through which the liquid is dispensed, an actuating button having a horizontally projecting discharge channel member which communicates with the hollow vertically reciprocable plunger, and means urging the hollow vertically reciprocable plunger to its uppermost position, the improvement comprising the provision of a locking system for said vertically reciprocable plunger, the system comprising:

a turret collar mounted on the container cap which projects upwardly and generally surrounds and guides the actuating button on its vertical reciprocable path, said turret collar having a vertical slot formed in the wall thereof adapted to receive the horizontally projecting discharge channel member which extends substantially beyond the circumference of the turret collar, said vertical slot being sufficiently long to permit full vertical movement of the discharge channel member in conjunction with operation of the hand held liquid dispenser, and a locking groove formed in the wall of said turret collar communicating with the vertical slot, said locking groove comprising a horizontally extending groove portion joining a vertically oriented groove at an upwardly curved portion, said vertically oriented groove having a closed upper end spaced a first distance below the uppermost position of the top of said actuating button and the opening of said horizontally extending groove portion being spaced a second greater distance below the uppermost position of the top of said actuating button so as to receive the discharge channel member on depression of said actuating button by an amount substantially equal to said second distance and relative rotation of said discharge member and said turret collar, said plunger urging means, when pressure is released from the actuating button, forcing said discharge channel member upwardly along said upwardly curved portion and into engagement with the closed upper end of said vertical slot.

4,889,263

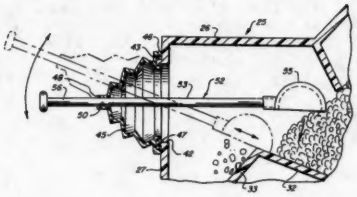
SEALED BIN CONTAINER

John P. Ellis, 9211 South Keeler, and Chris P. Ellis, 9124 South Tripp, both of Oak Lawn, Ill. 60453

Continuation-in-part of Ser. No. 69,634, Jul. 6, 1987, abandoned. This application Nov. 14, 1988, Ser. No. 270,058

Int. Cl.[4] B67D *5/06*

U.S. Cl. 222—185 **4 Claims**



1. A sealed barrier container of the type providing limited access to the interior confines of the container and adapted to contain a supply of bulk food product for metered dispensing therefrom, the container having an upper portion, a base for supporting said continer and a dispensing portion positioned intermediate therebetween, the upper portion having a bulk product hopper for containing a supply of bulk product, the dispensing portion being in operative relation with respect to said hopper and including at least one product ramp in communication with the hopper and extending outwardly therefrom to an exit chute portion, the improvement comprising in combination,

the dispensing portion of said container having an enlarged opening positioned in the front portion thereof,

a T-shaped flange surrounding said enlarged opening in the front portion of said dispensing portion and formed integrally therewith,

a flexible boot formed from a flexible resilient material and having an outer end and an inner end,

said inner end of said flexible boot provided with a T-shaped channel formed integrally therewith and adapted for mounting engagement with said T-shaped flange surrounding the enlarged opening in the front portion of said dispensing portion,

said boot adapted for mounting engagement on said container thereby to enclose said enlarged opening in the front portion of said dispensing portion,

said flexible boot having an accordion style configuration to enhance the flexibility thereof,

said outer end of said boot provided with an apertured fitting,

said apertured fitting completely encircling and carrying said scoop means therein such that said scoop means is connected to said sealed barrier container solely and entirely by said apertured fitting of said boot while permitting said scoop means the full range of movement including lateral movement, and full orbital movement within the confines of the sealed barrier container,

said scoop means including an elongate handle having an outer and extending through said apertured fitting of said boot and including a grasp portion for permitting the manipulation of said scoop means by a user, and an inner end adapted to retrieve product from the product ramp,

said apertured fitting portion of said boot being in sealing engagement with a portion of the outer end of said handle of said scoop means, while permitting reciprocating movement of said handle in said apertured fitting,

said container further including movable closure means carried in said exit chute portion alternately movable between a closed position to trap product therein and an open position to release product therefrom,

whereby a user of said product containing container may grasp the handle along the outer grasp portion thereof and manipulate the inner end of said scoop means by manipulating said scoop means carried by said flexible boot to retrieve product from the product ramp and deposit the same in the exit chute portion of the container, the scoop means being capable of reciprocating movement, lateral movement as well as orbital movement as a result of the single point of attachment of said scoop means to said boot, thereby to permit product removal from a totally sealed container by manipulation of an externally extending scoop means and avoid any possible product contamination.

4,889,264

SHIRT FOLDING MACHINE

Mekking Huang, No. 5, Lane 61, Ping Ho Road, Chung Ho, Taiwan

Filed Sep. 21, 1988, Ser. No. 247,158

Int. Cl.[4] D06F *89/02*

U.S. Cl. 223—37 **6 Claims**

1. A shirt folding machine, comprising:

an inside recessing housing;

two neck opening fixation plates symmetrically arranged at the two lateral sides of said housing, to stretch the neck opening of the shirt to be folded;

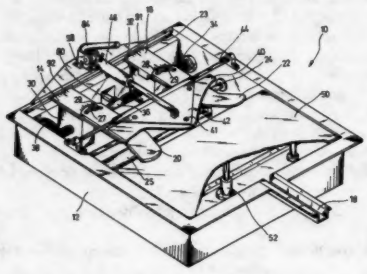
a driving mechanism being controlled to drive said neck opening fixation plates to relatively make reciprocal movement;

an adjusting device for adjusting the stroke of said two neck opening fixation plates;

a shirt folding mold board arranged in a configuration and size according to the shirt to be folded, movably mounted on the top of said housing for pivotal movement;

a driving mechanism being controlled to drive said shirt

folding mold board to close up at the top of said housing; and



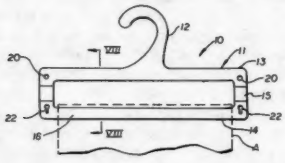
an ironing board arranged below said shirt folding mold board to match with said shirt folding mold board to clamp the shirt to be folded.

4,889,265

FOLDING PANT HANGER

Donald F. Morgan, Zeeland, Mich., assignor to Batts, Inc., Zeeland, Mich.

Filed May 15, 1989, Ser. No. 351,588
Int. Cl.[4] A47G *25/48*
U.S. Cl. 223—96 **12 Claims**



1. A dual purpose foldable garment hanger for both display and shipment of slacks and the like, said hanger having a unitary molded one-piece plastic body, said body having an upper support bar and a lower garment engaging bar and a pair of straps, one at each end of said bars integrally connecting said bars in vertically spaced relationship when said hanger is unfolded, the upper of said bars having a support hook for said hanger, said straps each having a hinge means between said bars whereby said straps can be folded to permit said lower bar to be pivoted upwardly and inverted and positioned in side-by-side relation to said upper bar and clamp a garment draped over said lower bar between said bars, means for detachably latching said bars together when in folded position.

4,889,266

APPARATUS FOR DONNING STERILE GLOVES AND STERILE GLOVE PACKAGE FOR USE THEREWITH

Patrick W. Wight, 4746 W. 4925 West, Kearns, Utah 84118

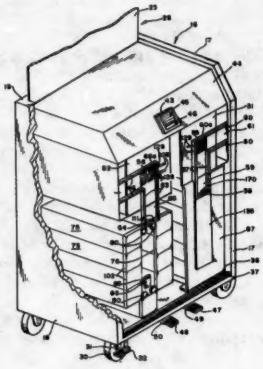
Filed Oct. 18, 1988, Ser. No. 259,354
Int. Cl.[4] A61B *19/00*
U.S. Cl. 223—111 **47 Claims**

1. Apparatus for donning sterile gloves wherein each glove is individually packaged in sterile condition in a package having a glove holder with glove cuff holding means surrounding an opening in the holder in which the glove is positioned and with a cover extending across the side of the opening faced by the outside surface of the glove to maintain the outside surface of the packaged glove in sterile condition and hold the glove within the package during handling and storage of the package, comprising:

a glove package loading area;

a vacuum chamber having an opening thereinto adapted to receive the glove package thereover and large enough to inflate the largest size glove to be used with the apparatus without such glove touching the walls of the chamber;

means for moving the glove package from the loading area into position over said opening;



means for opening the cover of the package to allow the glove to expand into the vacuum chamber from its securement around the cuff portion of the holder when vacuum is applied to the vacuum chamber;

means for applying vacuum to the vacuum chamber;

means for allowing release of the cuff of the glove from the holder after donning of the glove by a user so that the user can remove his gloved hand from the holder; and

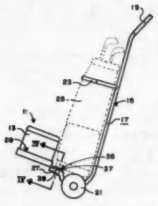
means for moving the package from which the glove has been removed from a position over the vacuum chamber opening to a package collection area.

4,889,267

COOLER CADDY FOR GOLF CART

David R. Bolton, 2670 Amy La., Apt. #1, Memphis, Tenn. 38128

Filed May 2, 1988, Ser. No. 189,393
Int. Cl.[4] B60R *9/00*
U.S. Cl. 224—274 **9 Claims**



1. A cooler caddy in combination with a beverage cooler, a golf bag having a bottom, and a golf cart having an outwardly extending protrusion for extending beneath said bottom of said golf bag, said caddy comprising:

(a) holder means for holding said cooler, said holder means including an open-top box structure having a bottom member; and

(b) attachment means for removably attaching said holder

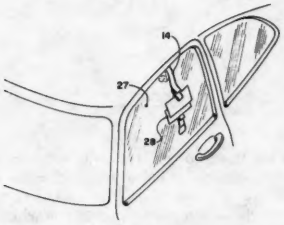
means to said golf cart, said attachment means including an extension member extending outward from said bottom member of said holder means for being positioned between said bottom of said golf bag and said protrusion of said golf cart with said bottom of said golf bag resting directly on said extension member to clamp said extension member between said bottom of said golf bag and said protrusion of said golf cart to securely hold said caddy to said golf cart.

4,889,268

AUTOMOBILE WINDOW CARD HOLDER

Daniel Shubeck, 619 38th Ave., Santa Cruz, Calif. 95062

Filed Apr. 10, 1989, Ser. No. 335,821
Int. Cl.[4] B60R *11/00*
U.S. Cl. 224—277 **5 Claims**



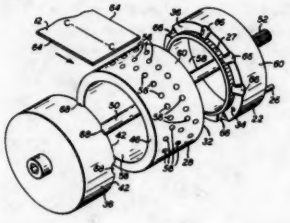
5. An automobile window card holder comprising a strip of material with a top end, a bottom end, and a back, said strip overlapped upon itself to form a series of pockets extending in the same direction and adapted for holding advertising cards, the top end of the strip is turned reversely to form a retaining flange for locking the strip on the top edge of an automobile window pane when closed.

4,889,269

WEB CENTER-GUIDING APPARATUS

Michael Long; Thomas W. Palone, both of Rochester, and Paul Kemp, Churchville, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 21, 1988, Ser. No. 254,341
Int. Cl.[4] B65H *23/24*
U.S. Cl. 226—97 **14 Claims**



1. An air-bearing center-guiding apparatus for supporting and laterally center-guiding a thin web along a longitudinally extending web center line, wherein the web has longitudinally extending side edges defining a predetermined web width, comprising:

an inner member having an inner end surface;

an outer member in alignment with the inner member and having an outer end surface;

a center member in alignment with and interposed between said inner and outer members and of a width substantially equal to said web width, said center member having a convex outer web-facing surface and opposite center end surfaces in mating engagement with said inner and outer surfaces;

a plurality of spaced-apart guide apertures formed at the interface between said center and surfaces and said inner and outer end surfaces and extended through said web-facing surface, said guide apertures being oriented substantially perpendicular to the web and arranged in a pair of parallel spaced-apart rows, each said guide aperture defining in cross-section an elongated aperture having a straight side and a curved side with one of said sides substantially in register with a side edge of said web and the other of said sides extended beyond said side edge, whereby each said elongated aperture is positioned substantially beyond said width of said web;

web-support means in said center member interposed between said rows of guide apertures and extended through said outer surface; and

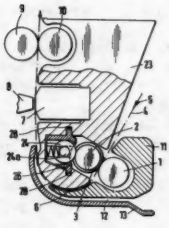
a source of pressurized air coupled to said web-support means for directing air therethrough to form an air cushion below the web and coupled to said elongated guide apertures for directing jets of air therethrough against the web edges for forming localized web-guiding deformations on the web edges for laterally center-guiding the web along the web center line.

4,889,270

DEVICE FOR THE PAPER TRANSPORT OF SINGLE SHEETS AND/OR CONTINUOUS PAPER IN OFFICE MACHINES, IN PARTICULAR IN MATRIX PRINTERS

Günter Gomoll, Nersingen/Leibi, and Wolfgang Hauslaib, Langenau, both of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

Filed Feb. 24, 1988, Ser. No. 159,775
Claims priority, application Fed. Rep. of Germany, Feb. 24, 1987, 3705857
Int. Cl.[4] B65H *20/00*
U.S. Cl. 226—181 **20 Claims**



1. A device for paper transport of individual sheets and/or endless webs in office machines comprising

a printer frame including two side plates;

a drive mechanism;

a first support structure at the printer frame;

a second support structure at the printer frame;

a first friction feed roll rotatably supported by the side plates and driven by the drive mechanism and having a positively running bending line based on support forces exerted on the first friction feed roll generated by the first support structure at the printer frame;

a second friction feed roll rotatably supported by the side plates having a negatively running bending line based on support forces exerted on the second friction feed roll generated by the second support structure at the printer frame where the first friction feed roll and second friction feed roll are provided as a roll pair for transporting paper; and

tuning means for tuning the first friction feed roll and the second friction feed roll with a mechanical force to each other thereby influencing the course of at least one bending line such that the bending line of the first friction feed roll and the bending line of the second friction feed roll are running approximately parallel;

compression springs engaging at a friction feed roll axis for supporting the support roll generating the support force in the center region; and

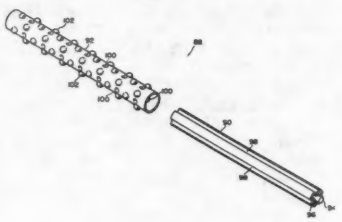
a circumferential recess in the internally disposed friction feed roll relative to a diameter employed in the paper transport for engaging the support roll.

4,889,271

FEED ROLLER

Toshio Kurokawa, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 20, 1987, Ser. No. 123,467
Claims priority, application Japan, Dec. 2, 1986, 61-185888
Int. Cl.[4] B65H *20/02*
U.S. Cl. 226—186 **11 Claims**



1. A feed roller for feeding an object in a clamped manner, comprising:

a hard roller body having a longitudinal axis and recesses which extend along said longitudinal axis and which are spaced apart around the circumference of said hard roller body;

a cylindrical resilient cover member fitted onto said hard roller body and having a longitudinal axis;

an internal contact portion formed on an inner surface of said cover member, said internal contact portion comprising second projections on said resilient cover member with a plurality of said second projections extending inwardly into engagement with each of said recesses and with said second projections being kept in contact with the recesses in the outer periphery of said hard roller body when said cover member is fitted onto said hard roller body;

an external contact portion formed on an outer surface of said cover member so as to project outwardly in the radial direction of said cover member, said external contact portion comprising at least two first hemispherical projections formed on the outer periphery of said cover member and convex in a direction substantially perpendicular to said longitudinal axis, said two first projections being spaced apart in a first direction substantially parallel to said longitudinal axis of said cover member by a distance less than the width of said object in said first direction; and

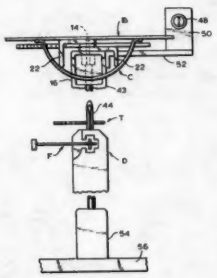
a space portion which defines a space between the inner surface of said external contact portion and the outer periphery of said hard roller body.

4,889,272

AUTOMATIC APPARATUS FOR ATTACHING TAGS TO LABELS PREVIOUSLY AFFIXED TO GARMENTS

Steven J. Kunreuther, 285 Central Park West, New York, N.Y. 10023

Filed Feb. 8, 1989, Ser. No. 307,514
Int. Cl.[4] B65L *7/00*; B31F *7/00*
U.S. Cl. 227—4 **21 Claims**



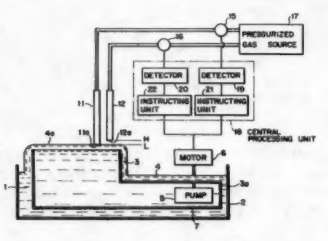
1. In an apparatus for automatically attaching one or more members to an article utilizing an attacher having a hollow needle through which a fastener is dispensed, the apparatus being of the type which has a support upon which the attacher is fixedly mounted, means positioning one or more members on the needle and means for actuating the attacher to dispense a fastener, the improvement comprising means for adapting the apparatus for use with a multi-layer article, to which the members are to be attached to only selected layers, the selected layers and the remaining layers defining an opening therebetween, said means comprising anvil means adapted to be received within said opening with the selected layers facing the attacher and means for moving said anvil means between a position remote from the needle and position intersecting the needle such that the needle penetrates the selected layers but not the remaining layers, means for actuating said attacher when said anvil means is in said intersecting position means and means for actuating said member positioning means in response to the movement of said anvil means to said remote position.

4,889,273

SOLDERING APPARATUS

Kenshi Kondo, Tokyo, Japan, assignor to Nihon Den-Netsu Keiki Co., Ltd., Tokyo, Japan

Filed Jun. 16, 1988, Ser. No. 207,228
Int. Cl.[4] B23K *3/06*
U.S. Cl. 228—8 **3 Claims**



1. A soldering apparatus comprising:

a solder vessel for containing a molten solder;

nozzle means disposed in said solder vessel and adapted for ejecting the molten solder therefrom;

feed means operable for feeding the molten solder in said solder vessel to said nozzle means so that a flowing layer of the molten solder is formed above said nozzle means during the operation of said feed means, the height of the upper surface of said layer being controlled by the feed rate of the molten solder in said feed means;

a source of a pressurized gas;

a first pipe having one end connected to said pressurized gas source and open ended at the other end and positioned at a first level so that the open end of said first pipe is closed by said layer of the molten solder to maintain the pressure therewithin in an increased state by confining the pressurized gas therein when the upper surface of said layer is positioned above said first level during operation of said feed means, the pressure within said first pipe being released by releasing the confined gas when the upper surface of said layer falls below said first level;

a second pipe having one end connected to said pressurized gas source and open ended at the other end and positioned at a second level higher than said first level so that the second pipe is closed by said layer of the molten solder to maintain the pressure therewithin in an increased state by confining the pressurized gas therein when the upper surface of said layer rises above said second level during operation of said feed means, the pressure in said second pipe being released by releasing the confined gas when the upper surface of said layer is below said second level;

first pressure switch responsive to the pressure in said first pipe and maintained in an actuated state when the pressure in said first pipe is in the released state;

second pressure switch responsive to the pressure in said second pipe and maintained in an actuated state when the pressure in said second pipe is in the increased state; and

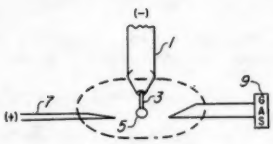
control means coupled to said first and second pressure switches and said feed means and adapted to cause said feed means to operate so as to increase the feed rate of the molten solder when said first pressure switch is maintained in said actuated state for a period of time exceeding a first, predetermined period and to decrease the feed rate of the molten solder when said second pressure switch is maintained in said actuated state for a period of time exceeding a second, predetermined period of time, thereby maintaining the surface height of the solder layer above the open end of the first pipe and below the open end of the second pipe.

4,889,274

GAS MIXTURE FOR USE IN CONTROL AND FORMATION OF BALL BONDS

Thomas H. Ramsey, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 22, 1988, Ser. No. 171,611
Int. Cl.[4] B23K *35/38*
U.S. Cl. 228—179 **2 Claims**



1. A method of bonding a wire to a semiconductor bonding pad, comprising the steps of:

(a) providing a wire taken from the class consisting of aluminum, copper and gold,

(b) providing an atmosphere surrounding said wire comprising from about 0.5 to about 10% neon, from about 10 to about 0.5% hydrogen, and the remainder essentially argon, and

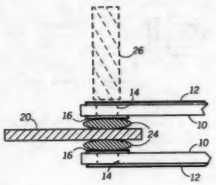
(c) forming an electric arc extending to said wire.

4,889,275

METHOD FOR EFFECTING SOLDER INTERCONNECTS

William B. Mullen, III, and Douglas W. Hendricks, both of Boca Raton, Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 2, 1988, Ser. No. 266,470
Int. Cl.[4] B23K *1/20, 31/00*
U.S. Cl. 228—180.2 **8 Claims**



1. A method of forming solder interconnects, comprising the steps of:

applying solder to metalized portions of a substrate,

applying pressure to the solder during a reflow process to prestress the the solder,

positioning at least a metalized portion of a film having through holes therein adjacent to the prestressed solder,

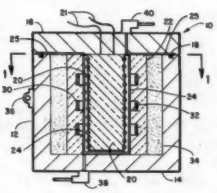
applying heating energy through the holes to melt the solder and form solder interconnections between the substrate and the metalized film.

4,889,276

METHOD AND APPARATUS FOR FORMING AND BONDING METAL ASSEMBLIES

Gilbert C. Cadwell, Lakeside, and Paul M. Phillips, San Diego, both of Calif., assignors to Rohr Industries, Inc., Chula Vista, Calif.

Filed Nov. 7, 1988, Ser. No. 267,999
Int. Cl.[4] B23K *20/00*
U.S. Cl. 228—265 **16 Claims**



1. An apparatus for forming metal assemblies which comprises:

a chamber having walls, a floor and a removable cover;

a heating element centrally located in said chamber;

a ceramic die at least partially surrounding said heating element and having a forming surface on a first side extending toward said heating element and adapted to receive metal parts for forming and bonding;

die support means in contact with the chamber interior walls filling the space between a second side of said die and said interior chamber walls; and

means to permit evacuation of gases from, and introduction

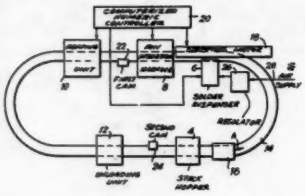
of high pressure gases into, the space between said heating element and said die.

4,889,277

METHOD AND APPARATUS FOR SURFACE MOUNTING TERMINALS

Irwin Zahn, New York, N.Y., assignor to Autosplice, Inc., Woodside, N.Y.

Filed Feb. 5, 1987, Ser. No. 11,143
Int. Cl.[4] B23K *31/02*
U.S. Cl. 228—180.2 21 Claims



3. Apparatus for manufacturing electronic parts including a mechanism for surface mounting a plurality of terminals on a corresponding plurality of surface areas on a flat side surface area of a substrate, said substrate having discrete solder means applied on each of said plurality of surface areas, comprising:

first and second work stations arranged along a given path and a first carriage arranged to travel along said given path,

said first carriage comprising means for supporting said substrate with said solder means exposed and extending substantially in a given plane and terminal-holding means for releasably receiving and holding a plurality of terminals each by only one end and leaving exposed and free a predetermined length at the opposite end,

said first work station comprising means for inserting discrete terminals into said terminal-holding means, and said second work station comprising heating means, said first work station being located before said second work station in the direction of carriage travel along said path,

means connected to said terminal-holding means for rotating same from a first terminal-receiving position facing said terminal-inserting means to a second position wherein portions of the terminals extend parallel to the plane of the solder means and contact the solder means along side surfaces of the terminals,

and means for causing the first carriage to follow the given path.

4,889,278

METHOD OF PRODUCING A PRINTED MAILER FORM

Donald J. Steidinger, Barrington, Ill., assignor to Wallace Computer Services, Inc., Hillside, Ill.

Continuation-in-part of Ser. No. 919,459, Oct. 16, 1986, Pat. No. 4,754,915. This application May 5, 1988, Ser. No. 190,408
Int. Cl.[4] B65D *27/00*
U.S. Cl. 229—92.1 19 Claims

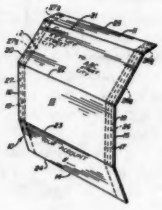
1. A method of producing a mailer having variable information thereon comprising

advancing a stream of elongated forms into a computer printer, each said form being rectangular, windowless and continuous throughout its entire area and having two short sides and two long sides, said advancing being parallel to said long sides

applying variable information at longitudinally spaced-apart areas on one face only of each form to provide addressee information in one area and message information in a second area,

applying adhesive to a portion of each form adjacent said long sides,

each said form being longitudinally perforated inwardly of each area of adhesive application to provide tear-off stubs at each form long side,



folding each form on itself parallel to said short sides at least three times to provide four panels with one panel separating the message information area from the addressee information area, said folding being effective to dispose the message information interiorly and the addressee information exteriorly of the folded form,

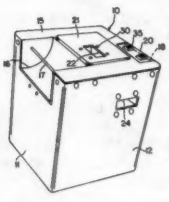
---

4,889,279

SAFE FOR COLLECTING PUBLIC TELEPHONE TOKENS

Mauricio Klabin, Rio de Janeiro-RJ, Brazil, assignor to Mec-Prec Mecanica De Precisao Industria E Comercio Ltda., Rio de Janeiro, Brazil

Filed Aug. 24, 1988, Ser. No. 235,937
Int. Cl.[4] G07B *15/00*
U.S. Cl. 232—15 2 Claims



1. A safe for receiving and collecting public telephone tokens, comprising a parallelepipedal box defined by side walls, a rear wall and a cover integrally attached to said side walls, wherein

a first side wall of said box has a semicircular cavity in its upper section, said cavity having a metallic handle therein,

a second wall opposite said first wall has a rectangular recess provided with orientation slots,

a sealing wax is provided which is fittable into lateral guides in said rectangular recess, said sealing wax being held in position by non-removable lock pins,

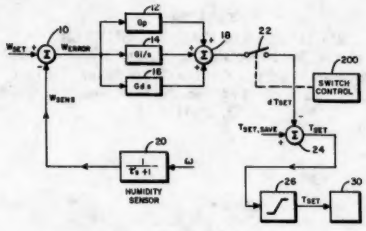
said cover has a recessing table having an asymmetric opening which leads to a token collecting trough, said trough being provided with a slot at its free end, and

one of said side walls has an opening which leads to a second token collecting trough which is provided with a slot at its free end.

4,889,280
TEMPERATURE AND HUMIDITY AUCTIONEERING CONTROL

Eric W. Grald, Maple Plain, and J. Ward MacArthur, Minneapolis, both of Minn., assignors to Gas Research Institute, Chicago, Ill.

Filed Feb. 24, 1989, Ser. No. 315,280
Int. Cl.[4] B01F 3/02
U.S. Cl. 236—44 C 6 Claims



1. An auctioneering control adapted to be connected to a thermostat control for temperature modifying apparatus wherein the thermostat control includes a temperature sensor which provides a sensed temperature signal, comprising:

(a) means for sensing absolute humidity and providing a first output signal corresponding to the sensed absolute humidity;

(b) first means for comparing the sensed absolute humidity with a predetermined value wherein the first comparing means receives the first output signal and provides a humidity error signal;

(c) means for modifying a predetermined temperature setpoint signal responsive to the humidity error signal;

(d) second means for comparing the modified humidity error signal with a predetermined setpoint signal and providing a modified temperature setpoint signal which is equal to the difference;

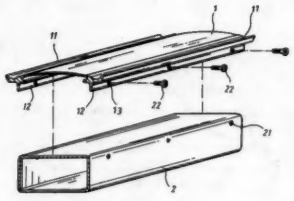
(e) means for limiting the modified temperature setpoint signal and providing a limited temperature setpoint signal; and

(f) third means for comparing the limited temperature setpoint signal with the sensed temperature signal.

4,889,281
SLIDING RAIL CONSTRUCTION FOR THE ROWING EXERCISING MACHINE

Michael Hung, 11th Floor, 624, Ming Chuan East Road, Taipei, Taiwan

Filed Aug. 22, 1988, Ser. No. 234,801
Int. Cl.[4] E01B 5/08; A63B 69/06
U.S. Cl. 238—143 3 Claims



1. A sliding rail construction in combination with a rowing exercising machine, comprising:

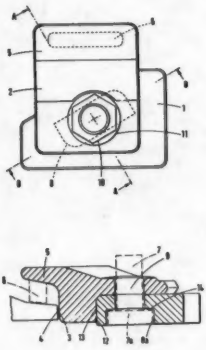
an upper sliding strip, made of aluminum alloy, having sliding troughs on its upper surface, and mounting means on its bottom surface; and

a rail base, made of ferrous metal, having holding means for receiving said mounting means to provide firm connection between said upper sliding stripe and said rail base.

4,889,282
RAIL CLIP ASSEMBLY

Ian M. Marchant, Ashstead, England, assignor to GH International Ltd., Georgetown,

Filed Dec. 15, 1987, Ser. No. 133,018
Claims priority, application United Kingdom, Dec. 17, 1986, 8630068
Int. Cl.[4] E01B 9/00
U.S. Cl. 238—347 4 Claims



1. A rail clip assembly for securing a rail to a rail support surface, comprising a first part adapted to be attached to the rail support surface adjacent the rail, a second part overlying the first part and having a lateral surface for abutment with a lateral face of the rail, and fixing means for fixing the second part to the first part independently of attachment of the first part to the rail support surface, wherein the parts have aligned apertures therethrough through which the fixing means extends, one of the apertures being elongate to enable the second part to assume different positions relative to the first part, the elongate aperture extending in a direction inclined at an acute angle to the longitudinal direction of the rail, the first and second parts having cooperating substantially laterally directed surfaces which are abutted in all relative positions of the parts for transmitting to the first part laterally directed forces applied to the second part by the rail, the said laterally extending surfaces extending parallel to the direction of extent of the elongate aperture, the first part having parallel upper and lower, surfaces, the second part having an upper surface which, adjacent the aperture, is inclined with respect to the horizontal so that the second part increases in thickness along the direction of the cooperating laterally directed surfaces, and the fixing means extending through the apertures in a direction perpendicular to the inclined surface of the second part and thus inclined with respect to the vertical.

4,889,283

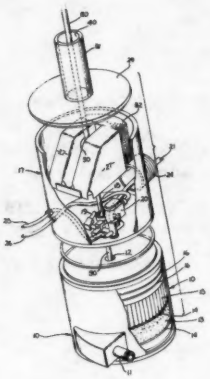
APPARATUS AND METHOD FOR STREAM DIVERTER

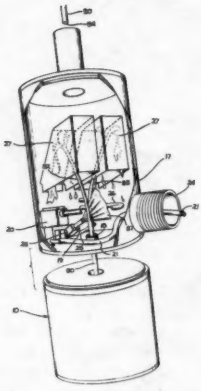
Mark Fuller, Studio City, and Alan S. Robinson, El Monte, both of Calif., assignors to Wet Enterprises, Inc., Universal City, Calif.

Continuation of Ser. No. 96,315, Sep. 9, 1987, abandoned, which is a continuation of Ser. No. 800,223, Nov. 25, 1985, abandoned. This application Aug. 22, 1988, Ser. No. 235,798

Int. Cl.[4] B05B *17/04, 17/08*

U.S. Cl. 239—11 9 Claims





6. A method of diverting the laminar flow stream outputted by a laminar flow nozzle, said method comprising the steps of:

coupling and sealing to said nozzle an enclosure, said enclosure having first and second openings substantially opposite one another, said openings coincident with said laminar flow stream;

providing a continuously flowing diverting stream of water to said enclosure;

providing spray means in said enclosure, said spray means adjustably coupled to said enclosure relative to said first opening;

directing said diverting stream to said spray means, said spray means producing an output stream intercepting said laminar flow stream such that said flow stream is diverted from said second opening;

receiving said diverted laminar flow stream in a plurality of catch basins disposed in said enclosure;

removing said diverted flow stream and said diverting stream through drain means coupled to said enclosure;

disposing said enclosure beneath the surface of a body of water; and

providing a path for said laminar flow stream through an extended member coupled to said enclosure for extending above the surface of said body of water, said laminar flow stream exiting said extended member for display of said laminar flow stream.

4,889,284

RECHARGEABLE AIR FRESHENER

Donald Spector, 380 Mountain Rd., Union City, N.J. 07087

Continuation-in-part of Ser. No. 148,009, Jan. 25, 1988, abandoned. This application Dec. 29, 1988, Ser. No. 291,862

Int. Cl.[4] A61L *9/04*

U.S. Cl. 239—34 10 Claims

1. A rechargeable air freshener comprising:

(a) an outer casing formed of permeable fabric material and contoured to define a figure including a head section and a body section joined thereto;

(b) a core of compressible material stuffing all sections of the casing and having an internal cylindrical cavity therein, whereby the resultant figure is soft and squeezable, said material having liquid absorbent and wicking properties; and

(c) a self-contained fragrance dispenser constituted by a cylindrical can whose diameter is substantially the same as the diameter of the cavity containing a volatile liquid fragrance, an axially-depressible head at the upper end of the can having a spray nozzle from which the liquid is sprayed when the head is depressed, said dispenser being disposed in said internal cavity which extends from the body section to the head section to place the actuator head at a position in the head section below a scalp region of the casing, whereby when pressing the scalp region to operate the actuator head, fragrance is sprayed into the core material in the head section and wicked thereby throughout the core material within the casing, the liquid fragrance volatilized from the outer surface of the core passing through the permeable casing to be discharged into the atmosphere.

4,889,285

DEVICE FOR DISPENSING VOLATILE FRAGRANCES

George A. Locko, Savannah, Ga., assignor to Union Camp Corporation, Wayne, N.J.

Continuation-in-part of Ser. No. 787,068, Oct. 15, 1985, abandoned. This application Dec. 5, 1988, Ser. No. 280,164

Int. Cl.[4] A61L *9/00*

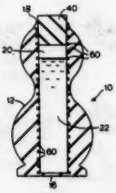
U.S. Cl. 239—34 3 Claims

1. An article for dispensing a volatile fragrance to the atmosphere, which comprises:

a silicone rubber hollow body containing in the hollow thereof the volatile fragrance composition;

said body being substantially impermeable to said composition in a volatilized form;

said body being penetrable by said composition in a liquid



form, at a rate less than the rate of volatilization of the liquid volatile composition as it reaches the outer surface of the hollow body under ambient temperature and pressure conditions.

4,889,286

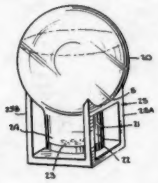
CONTROLLABLE AIR FRESHENER UNIT

Donald Spector, 380 Mountain Rd., Union City, N.J. 07087

Filed Sep. 19, 1988, Ser. No. 245,693

Int. Cl.[4] A61L *9/12*

U.S. Cl. 239—47 **9 Claims**



1. A wickless controllable air freshener unit comprising:

(A) a bottle filled with a liquid fragrance and provided with a cap thereon having vent holes therein;

(B) a membrane formed of microporous material, disposed on the underside of the cap to cover the vent holes; and

(C) a stand supporting said bottle above the surface on which the stand is placed in either an upright position in which the level of liquid in the bottle is below the membrane which then acts as a barrier to prevent vapor emitted from the liquid fragrance from passing through the vent holes, in which state the unit is turned off, or in an inverted position in which the liquid rests on the membrane and the cap is raised above said surface, the membrane then becoming impregnated with the liquid which is volatilized from the membrane to produce a vapor that is exuded into the atmosphere through the cap vent holes, in which state the unit is turned on whereby a user may turn the unit on or off simply by changing the bottle position on the stand.

4,889,287

JET SPRAY SPRINKLER

Stephen T. Hemsley, Murray Bridge, and Bogdan Roszowski, Reynella, both of Australia, assignors to James Hardie Building Products Pty. Limited, New South Wales, Australia

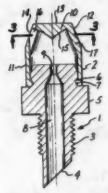
PCT No. PCT/AU87/00128, § 371 Date Jan. 5, 1988, § 102(e) Date Jan. 5, 1988, PCT Pub. No. WO87/06859, PCT Pub. Date Nov. 19, 1987

PCT Filed May 4, 1987, Ser. No. 175,042

Claims priority, application Australia, May 6, 1986, PH5763

Int. Cl.[4] B05B *1/34*

U.S. Cl. 239—498 **5 Claims**



1. A sprinkler having a body formed about an axis, an inlet end at one end of the body and an outlet end at the opposite end of the body, a passage axially through the body, means for connecting the inlet end to a source of water supply, a nozzle at the outlet end, a distribution cap having an open end and a closed end fitting over the outlet end by a skirt engaging the body, the outer surface of the cap having a conical shape defined about the axis of the body and tapering towards the closed end of the cap, the interior of the closed end of the cap being formed of a surface of revolution defined by rotating a curve around the said axis of the cap, and perforations which extend at least part way around the cap being defined by the conical shape of the external wall combined with serrating the surface of revolution afjacent the external wall, the surface of revolution defining a cusp axially of the cap about the said axis, said cusp extending from said axis toward said perforations, and the surface of revolution smoothly curving progressively toward the closed end of the cap throughout the full length of the surface of revolution.

4,889,288

FUEL INJECTION NOZZLE

David J. Gaskell, Sudbury, Great Britain, assignor to Lucas Industries Public Ltd. Company, Birmingham, United Kingdom

Filed Apr. 25, 1988, Ser. No. 185,833

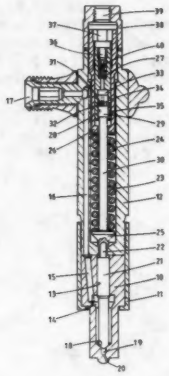
Claims priority, application United Kingdom, Apr. 24, 1987, 8709712

Int. Cl.[4] F02M *45/00, 61/20*

U.S. Cl. 239—533.5 **7 Claims**

1. A fuel injection nozzle for supplying fuel to an internal combustion engine comprising a valve member slidable in a bore in a nozzle body, a seating at one end of the bore, said valve member being shaped for co-operation with said seating to control the flow of fuel through an outlet, a nozzle holder to which said body is secured, a chamber defined in said holder and a coiled compression spring in said chamber, one end of said spring being operatively connected to said valve member to bias said valve member into contact with said seating, said valve member defining an area against which fuel under pres-

sure from an inlet can act to lift said valve member away from said seating against the action of said spring, characterized by a piston mounted on a part movable with said valve member, a groove defined in the wall of said piston, a port in the wall of said piston and a flat formed on the exterior surface of said piston, said flat connecting said port with said chamber containing said spring, a cylinder in which said piston is movable, said cylinder being defined in a member which is adjustable from the end of said holder remote from said nozzle body, said cylinder and piston defining a damping chamber and a fuel leakage path communicating said groove with said damping chamber, the degree of restriction of said leakage path being determined by the setting of said member in said holder.



4,889,289

METHOD AND APPARATUS FOR CRUSHING MATERIAL FOR GRINDING

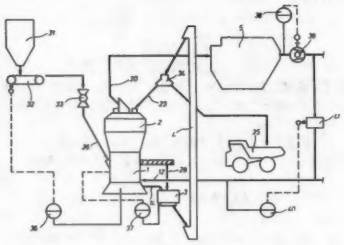
Ludger Lohnherr, Oelde, and Walter Holz, Beckum, both of Fed. Rep. of Germany, assignors to Krupp Polysius AG, Fed. Rep. of Germany

Filed May 6, 1988, Ser. No. 191,049

Claims priority, application Fed. Rep. of Germany, May 27, 1987, 3717976

Int. Cl.[4] B02C *23/32*

U.S. Cl. 241—18 **14 Claims**



1. The method of crushing brittle material for subsequent grinding comprising:

(a) feeding brittle material into a grinding zone;

(b) grinding said material in said grinding zone;

(c) delivering adequately ground material to a sifting zone at a level above that of said grinding zone;

(d) delivering insufficiently ground material by gravity from said grinding zone to a crushing zone at a level below that of said grinding zone;

(e) roll crushing material in said crushing zone;

(f) conveying a selected proportion of crushed material from said crushing zone to said sifting zone for further sifting thereof; and

(g) returning at least a portion of tailings from said sifting zone to said grinding zone for further grinding thereof.

4,889,290

WASTE DISPOSAL APPARATUS

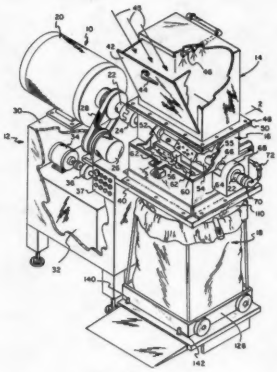
Robert M. Koffsky, Hopewell Junction, N.J., and Finn S. Pedersen, Telgte/Munster, Fed. Rep. of Germany, assignors to Affald International Inc., Hopewell Junction, N.Y.

Continuation of Ser. No. 165,145, Mar. 7, 1988, Pat. No. 4,809,915. This application Feb. 27, 1989, Ser. No. 316,088

The portion of the term of this patent subsequent to Mar. 7, 2006, has been disclaimed.

Int. Cl.[4] B02C *18/22*

U.S. Cl. 241—36 **13 Claims**



1. Comminuting apparatus comprising:

rotary grinder means enclosed within a housing having inlet and outlet openings, for comminuting waste into particulate matter, said rotary grinder means provided with a plurality of removable cutting knives;

hopper means mated with said inlet opening for receiving waste;

a waste receptacle for receiving comminuted waste from said rotary grinder means, said waste receptacle provided with a sealable opening; and

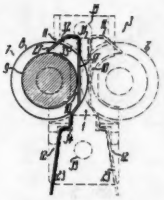
valve means positioned between said outlet opening and said waste receptacle opening, said valve means, when open, having an extendable sleeve which extends through said waste receptacle's opening and provides a seal between the interior of said waste receptacle and the outside environment, whereby a fluid tight interior environment is provided for said comminuting apparatus.

4,889,291

STRIP-OFF DEVICE FOR SHEDDING MACHINES WITH SHEET MATERIAL GRID ENGAGING BETWEEN SHREDDING DISKS

Albert Goldhammer, Ueberlingen; Hans Schleicher, Markdorf; Hartmut Stangenberg, Owingen, and Rolf Gasteier, Markdorf, all of Fed. Rep. of Germany, assignors to Feinwerktechnik Schleicher & Co., Fed. Rep. of Germany

Filed Mar. 4, 1988, Ser. No. 164,222
Int. Cl.[4] B02C *18/22*
U.S. Cl. 241—167 21 Claims



1. A strip-off device for shredding machines having shredding disks on at least one shredding roller, said device comprising:

at least one strip-off unit;

at least one strip-off grid defined by said at least one strip-off unit, strip-off webs of said strip-off grid being engageable between said shredding disks;

at least one strip-off comb defined by said at least one strip-off unit, strip-off tongues of said strip-off comb being engageable between said shredding disks substantially at a circumferential distance around the shredding disks relative to said strip-off webs;

supporting profiles bearing said strip-off webs and said strip-off tongues, said supporting profiles being mountable on said shredding machine, and

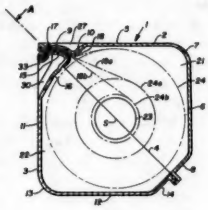
wherein at least one of said supporting profiles for said strip-off comb is a sheet material profile providing said strip-off tongues, at least one said sheet material profile connecting said strip-off comb to said strip-off grid, thereby providing a connecting profile.

4,889,292

LIGHTPROOF CASSETTE

Erhard Loewe, Waldesch, and Ludger Bertels, Nottuln, both of Fed. Rep. of Germany, assignors to E. I. Du Pont De Nemours and Company, Wilmington, Del.

Filed May 1, 1989, Ser. No. 345,934
Claims priority, application Fed. Rep. of Germany, May 11, 1988, 3816184
Int. Cl.[4] B65H *16/00;* B65D *85/67*
U.S. Cl. 242—71.1 9 Claims



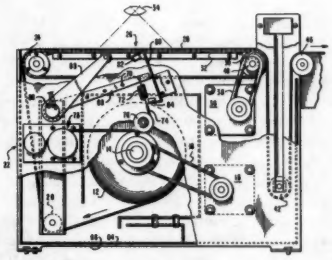
1. A lightproof cassette for holding a roll of light-sensitive web material, the cassette comprising: an outlet slit oriented parallel to a rotational axis of the roll, the slit being formed between two lips, which are provided with a lining that prevents light entry, characterized in that at least a first one of the lips is joined on its side away from the slit with bars.

4,889,293

APPARATUS AND METHOD FOR CONTROLLING TENSION IN A MOVABLE WEB

Ronald J. Duke, Miamisburg, and Jack Beery, Centerville, both of Ohio, assignors to The Mead Corporation, Dayton, Ohio

Filed Feb. 16, 1988, Ser. No. 156,495
Int. Cl.[4] B65H *23/08, 25/22*
U.S. Cl. 242—75.51 15 Claims



1. Apparatus for controlling tension in a movable web, comprising:

frame means for supporting a supply roll from which the web may be drawn:

means for applying torque to the supply roll;

means connected to said frame means for defining a nominal web path and for locating the web along said nominal path;

means positioned along said path for measuring displacement of the web from said nominal path, and for generating a signal representative of said web displacement;

control means connected to said displacement measuring means for receiving said displacement signal and generating in response thereto a torque signal representative of a torque value to be applied to the supply roll to return the web to said nominal path;

said control means further being connected to said torque applying means for controlling said torque applying means in accordance with said torque signal;

said control means including:

a plurality of tables incrementally ordered, each said table having a plurality of said torque values;

said control means operating by mapping said web displacement to one of said torque values within a selected one of said tables;

clock means for generating a plurality of clock pulses;

comparator means for comparing said web displacement with said nominal path and determining whether said web displacement differs in one direction from said nominal path during any one clock pulse; and

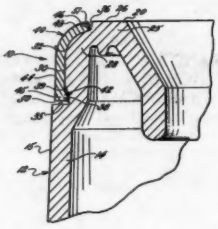
table selection means responsive to said comparator means for changing the selected one of said tables whenever said web displacement differs consistently from said nominal path during a predetermined consecutive number of said clock pulses.

4,889,294

YARN CARRIER WITH INTERCHANGEABLE IDENTIFYING RING

Samuel F. Adams, and Hans-Peter Bolz, both of Greenville, S.C., assignors to Sonoco Products Company, Hartsville, S.C.

Filed Nov. 17, 1988, Ser. No. 272,735
Int. Cl.[4] B65H *75/10*
U.S. Cl. 242—118.3 **13 Claims**



1. A yarn carrier adapted to be mounted on a winding machine to have a yarn wound thereon to form a yarn package, said yarn carrier comprising:

a tube having opposite ends, a peripheral wall defining an outer peripheral surface for receiving the yarn to be wound thereon, an external annular channel formed into said outer peripheral surface and communicating with one of said ends, with said channel including an annular groove adjacent the side of said channel distal from said one end and wherein said annular groove extends radially inwardly a distance further than the distance that the remainder of said channel extends radially inwardly, said annular groove having an inclined annular surface sloping outwardly and in the general direction of said one end;

a resilient ring having a particular identifying characteristic and positioned within said external annular channel and having an inwardly extending annular rib extending into said annular groove for grippingly engaging said tube, and wherein said ring does not extend beyond said one end of the tube and said ring further has an outer surface portion which extends approximately flush with said outer peripheral surface of said tube, and said annular rib having a rounded inner surface positioned in opposing relation to said inclined surface and cooperating with said inclined surface for facilitating manual removal of said ring by the exertion of an axial force on the ring so as to move said rounded inner surface of said annular rib along said inclined surface.

4,889,295

OPTICAL FIBER SLEEVING GUIDE

Clarence J. McMoore, Jr., Huntsville, and Melba T. Graham, Brownsboro, both of Ala., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 19, 1988, Ser. No. 286,417
Int. Cl.[4] B65H *75/10, 75/28, 55/04*
U.S. Cl. 242—118.3 **3 Claims**

1. A fiber optic winding system comprising:

a bobbin;

a sleeve mounted on said bobbin for receiving an optical fiber; and

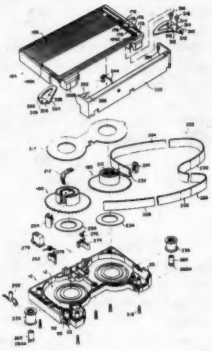
a flexible and rigid filament, said filament extending through the entire length of said sleeve and being removable from said sleeve.

4,889,296

APPARATUS FOR GROUNDING CASSETTE

Izumi Watanabe, and Keiichi Yamana, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 870,556, Jun. 4, 1986. This application Jun. 11, 1987, Ser. No. 60,555
Claims priority, application Japan, Jul. 12, 1985, 60-106591
The portion of the term of this patent subsequent to Aug. 11, 2004, has been disclaimed.
Int. Cl.[4] G03G *21/00*; G11B *23/087*
U.S. Cl. 242—199 **4 Claims**



1. An apparatus for grounding a cassette, comprising:

a cassette casing for accommodating a tape having an electrically conductive portion;

first contact means provided on said cassette casing so as to be exposed, said first contact means having a plurality of first contact points each of which is electrically connected to said electrically conductive portion of said tape accommodated in said cassette casing;

loading means into which said casing is loaded; and

at least one second contact means provided on said loading means and adapted to contact one of said first contact points on said cassette casing when it is loaded in said loading means, thereby grounding the tape accommodated in said cassette casing;

at least one third contact provided on said loading means and adapted to contact the other of said first contact points on said cassette casing when it is loaded in said loading means;

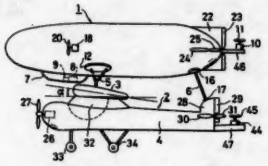
detecting means electrically connected to said at least one third contact for detecting a contact condition between said at least one second contact means and said first contact point.

4,889,297

LIGHT AIRCRAFT FOR SHORT-DISTANCE TAKEOFF AND LANDING

Minoru Ikeda, 526-3, Ohishi-machi, Kurume-shi, Fukuoka-ken, Japan

Filed Nov. 4, 1988, Ser. No. 267,276
Claims priority, application Japan, Nov. 11, 1987, 62-285739
Int. Cl.[4] B64B *1/20*; B64C *1/34*
U.S. Cl. 244—5 **3 Claims**



1. A light aircraft for short distance takeoff and landing, comprising an airplane and an airship,

said airplane comprising a fuselage, an operating compartment located within said fuselage and in which said airplane is controlled, a main plane mounted on said fuselage for providing a dynamic lifting force, first propeller means provided on a rear pedestal of said fuselage for producing vertical propulsion, and means for rotating said propeller means,

said airship comprising a balloon containing a buoyant gas for providing a static lifting force, a gondola provided on the lower surface of said balloon and in which said airship is controlled, supporting means for supporting and locating said airship above said fuselage of said airplane, second propeller means provided on a rear pedestal of said airship for producing vertical propulsion, means for rotating said second propeller means, and a flight attitude sensor provided within said gondola so as to be always directed in the vertical direction and adapted to transmit to said two means for rotating said first and second propeller means a first signal during nose-up flight of said balloon or a second signal during nose-down flight of said balloon.

4,889,298

WALL FEEDTHROUGH FITTING

Werner Hauff, Dischingen, Fed. Rep. of Germany, assignor to Plastoform GmbH & Co. KG, Vlotho, Fed. Rep. of Germany

Filed Aug. 12, 1988, Ser. No. 231,884
Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727160
Int. Cl.[4] H02G *3/22*
U.S. Cl. 248—56 **14 Claims**

1. In combination with a wall formed with an opening forming two paris of parallel inner side surfaces and forming longitudinally directed inner and outer peripheral surfaces and at least one conduit extending longitudinally through the opening, a feedthrough fitting comprising:

a plurality of similar elastomeric liner blocks each extending the full width of the opening from one of the side surfaces thereof to the opposite parallel side surface thereof, each block being formed with

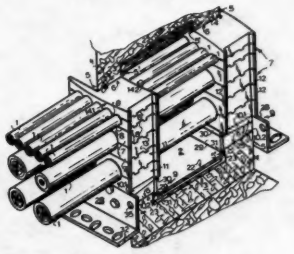
at least one interface surface directly engaging the interface surface of an adjacent block,

at least one half seat on one of the interface surfaces complementary to the conduit and snugly engaging same,

a nonplanar formation extending the full width of the opening on each of the interface surfaces and hermetically interfitting with the nonplanar formation of the adjacent block, and

outwardly directed inner and outer lips that extend laterally past the respective opening and engage on the inner and outer peripheral surfaces; and

a tightener having



a pair of wedges engaged between the blocks and an inner surface of the opening, and

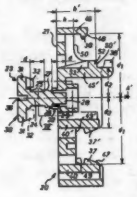
means for pulling the wedges longitudinally together and thereby pressing the blocks transversely together at their interface surfaces.

4,889,299

DUCT MOUNTING FIXTURE FOR SECURING A DUCT ON A SUPPORT SECTION

Francois Sarton, Totes, and Gérard Roby, Bihorel, both of France, assignors to Legrand, Limoges (Cedex), France

Filed Dec. 27, 1983, Ser. No. 565,764
Claims priority, application France, Dec. 27, 1982, 82 21807
Int. Cl.[4] F16L *3/24*
U.S. Cl. 248—72 **27 Claims**



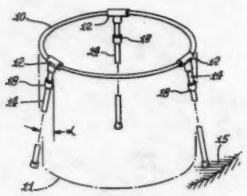
1. A duct mounting fixture for securing ducts to generally channel-shaped support sections each having a base, sidewalls and right angle flanges at distal ends of said sidewalls, said duct mounting fixture comprising a base plate having an outer side defining a bearing plane against which an endwall of a duct is adapted to bear, means for receiving a fastening member being located in a middle zone of said base plate, said fastening member being adapted toextend through an opening in an endwall of the duct and grip the endwall, two pairs of retaining teeth formed on said base plate separate and apart from said means for receiving said fastening member, said retaining teeth being disposed on an inner side of said base plate and being selectively cooperable with the right angle flanges of the corresponding support sections, said teeth of each pair of teeth being disposed on opposite sides of said means for receiving said fastening member, at least one of the retaining teeth of each of said pairs of retaining teeth being carried by a resiliently deformable arm.

4,889,300

TRASH BAG SUPPORT WITH COLLAPSIBLE LEGS

David E. Gibson, 717 Cynthia St., Alhambra, Calif. 91801, and Steven D. Gibson, 8336 Mission Dr., Rosemead, Calif. 91775

Filed Mar. 23, 1989, Ser. No. 327,606
Int. Cl.[4] A63B 55/04
U.S. Cl. 248—97 9 Claims



1. A support structure for a flimsy plastic bag, comprising

(a) a lightweight plastic loop, about which the loop extends to define substantially a circle in a horizontal plane and defining a looping axis,

(b) sleeves mounted on the loop at at least three spaced apart locations, to pivot, with frictional resistance, about said axis,

(c) elongated legs carried by said sleeves to project away from the sleeves sidewardly therefrom whereby the legs may be pivoted between retracted positions adjacent a plane defined by the loop, and downwardly extended positions to support the loop spaced above a surface above which the legs extend, each leg, beyond its associated sleeve, being of single-piece construction and having a length substantially greater than the diameter of the plastic circular loop, whereby in retracted position the legs extend in overlapping relations proximate said axis and project outwardly of the loop circle,

(d) the loop and sleeves sized to allow folding of the top edge portion of the bag thereover, with the main extent of the bag depending from and below the loop, between said legs,

(e) said sleeves having straight cylindrical bores defining straight axes, said loop having curved extents defining a curved axis extending in the direction of the loop, said loop curved extents frictionally engaging said straight bores to create frictional resistance to sleeve pivoting, whereby the legs are frictionally held in said overlapping relation when the legs are in said retracted positions.

4,889,301

STAND FOR A SHORTHAND MACHINE

Patricia J. Yerkes, 2478 Erin Way, Eugene, Oreg. 97401

Filed Feb. 10, 1989, Ser. No. 308,640
Int. Cl.[4] F16M 13/00
U.S. Cl. 248—124 3 Claims

1. A stand for adjustably supporting a machine in an inclined manner, said stand comprising,

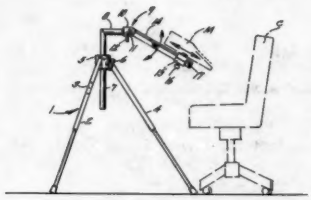
a base,

a post adjustably supported by said base for vertical adjustment and including an arm segment having a distal end,

pivot means on said distal end having a horizontal axis, said pivot means including a clevis, a lock in place on said clevis,

an arm having a boss carried by said clevis and positionable in an inclined manner about said horizontal axis, a slide adjustably mounted on said arm and lockable thereto at points therealong, said slide including a mount insertable into the base of a machine, and

said slide defining an opening of tee shape generally corresponding to a cross section of said arm, said arm including a limit stop screw contactible by the slide to limit travel of



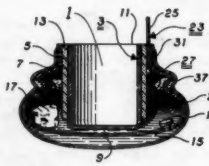
said slide to prevent accidental separation of a machine from the arm.

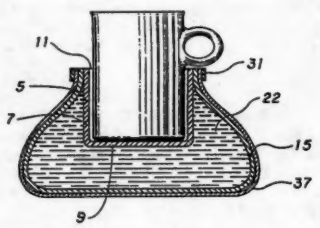
4,889,302

DRINKING CONTAINER HOLDER

Dalton R. Tucker, 18218 Paradise Valley Rd. Space 91, Valley Center, Calif. 92082

Filed Feb. 10, 1989, Ser. No. 308,472
Int. Cl.[4] F25D 3/08
U.S. Cl. 248—146 34 Claims





16. A drinking container holder comprising:

(a) means for supporting a drinking container including a rigid, open-topped receptacle terminated by an upper rim and having an enclosed bottom wall;

(b) a water-impervious bladder secured about said receptacle and extending loosely therearound and beneath it to form a liquid-sealed chamber therebetween; and,

(c) an amount, sufficient to fill said chamber, of a mixture comprising:

(1) a small amount of a bacteriostat;

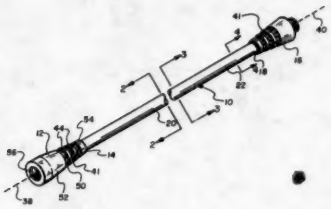
(2) a small quantity of fibrous material of the type that will swell in the presence of a liquid to form a thick, mushy substance; and,

(3) sufficient liquid to form the thick, mushy substance.

4,889,303
FLEXIBLE ARM RETAINER DEVICE

Mitchell E. Wolf, 2450 S. 3200 West #4, West Valley City, Utah 84119

Filed Jun. 24, 1988, Ser. No. 211,367
Int. Cl.[4] F16M 13/00
U.S. Cl. 248—160 7 Claims



1. A flexible retainer for use in supporting an object above a base member, said retainer comprising:

an elongate hollow flexible elastomeric tube defining a channel throughout a length thereof; said tube having a first end and a second end;

a metal core mounted within said channel, said metal core being sufficiently flexible to be manually bendable into a variety of configurations yet sufficiently rigid to retain a configuration imparted thereto;

a first housing mounted on said first end, said first housing being adapted to mechanically associate with and retain an object to be supported; said second end being adapted for mounting on said base member; said first housing including:

a first flexible elongate end segment mounted on sai first end of said tube,

a second flexible elongate end segment mounted spacedly from said first end segment on said tube proximate said first end,

a first plurality of flexible annular members coaxially mounted on said tube between said first end segment and said second end segment, said annular members being spacedly mounted from each other along a length of said tube,

a first plurality of flexible, longitudinally extending bridging support members mounted on said first end segment and said second end segment to extend therebetween, said bridging support members being spacedly positioned from each other about a circumference of said tube, said bridging support members being mounted to said annular members, thereby connecting said annular members to each other,

wherein said first housing defines a structure adapted to transfer the stress of a load retained by said first end segment incrementally over a region of said tube proximate said first end thereof.

4,889,304
ALL PLASTIC DISPLAY HOOK WITH LOCKING FEATURE

Joel I. Glickman, Huntingdon Valley, and Robert F. Pflug, Quakertown, both of Pa., assignors to Trion Industries, Inc., Wilkes-Barre, Pa.

Filed Jun. 1, 1988, Ser. No. 200,931
Int. Cl.[4] A47F 7/00; E04G 3/00
U.S. Cl. 248—222.1 4 Claims

1. In a merchandise display hook for mounting on an apertured display board and of the type including a base portion having spaced L-shaped mounting lugs, a support element extending forwardly from said base member, and locking means for preventing upward tilting of said base portion, the improvement characterized by

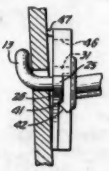
(a) said base portion and said support element being integrally formed of plastic material,

(b) a locking key of molded plastic construction comprising an upper body portion and a plurality of integral vertically downwardly extending guide legs,

(c) said guide legs including a rear, centrally disposed leg and a pair of front legs arranged in straddling relation to said rear leg,

(d) said front and back guide legs straddling said base portion on the front and back sides thereof,

(e) vertically extending guide means on the front and back of said base portion for receiving and supporting said front and back guide legs,



(f) said vertically extending guide means comprising an integral, vertically extending forwardly projecting ridge-like central section of said body portion,

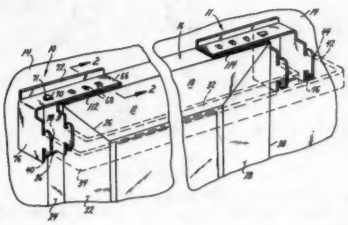
(g) said ridge-like section having a rearwardly opening vertical channel therein for receiving the rear leg of said locking key and forwardly and outwardly facing, vertically extending surfaces for supporting said front guide legs, and

(h) interlocking means on at least certain of said guide legs and said base portion whereby, upon assembly of said locking key to said base portion, said key is lockingly secured to said base portion.

4,889,305
UNIVERSAL BRACKET

Larry G. Mahan, 14 Greenwood, Lebanon, Mo. 65536

Filed Jun. 17, 1988, Ser. No. 208,160
Int. Cl.[4] A47H 1/10
U.S. Cl. 248—265 2 Claims



1. A bracket comprising:

(a) bracket support means for supporting the bracket on a portion of a trim member, the bracket support means including an attachment member attachable to the trim member portion for supportably attaching the bracket on the trim member portion,

(b) accessory support means for supporting an accessory, the accessory support means including a supporting configuration for supportably receiving the accessory,

(c) framing means defined by the accessory support means for providing a substantially rigid sub-structure is at least partially supportable by a wall portion adjacent the trim member as a result of the weight of the accessory sup-

ported by the bracket, which accessary weight further results in improved support of the bracket and the accessory,

(d) the accessory support means including a first support portion and a second support portion,

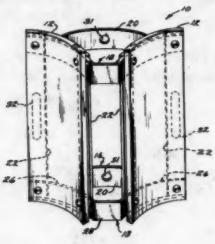
(e) connecting means for connecting the second support portion and the bracket support means and further defining framing means,

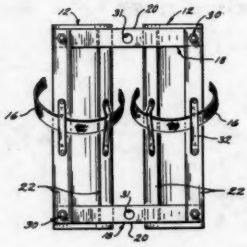
(f) the bracket support means includes a substantially planar bracket support portion,

(g) the connecting means includes a bendable tab portion extending generally longitudinally from the second support portion, and

(h) the connecting means further including a slot for receiving the bendable tab portion, the slot defined by the substantially planar bracket support portion.

4,889,306
SCUBA TANK MOUNTING BRACKET
Robert C. Boucher, 26 Allan Dr., Vernon, Conn. 06066
Filed Sep. 20, 1988, Ser. No. 247,036
Int. Cl.[4] B63C *11/52*
U.S. Cl. 248—313 **5 Claims**





1. A SCUBA tank adapter comprisng:

a pair of curved tank receiver means horizontally displaced from one another for supporting a pair of tanks;

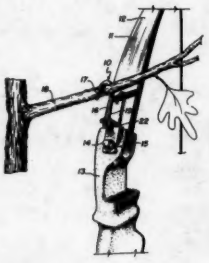
a pair of brackets vertically spaced along the tank receiver means for spatially supporting said tank receiver means, each of said brackets comprising a pair of arcuate section, with one arcuate section of each bracket connected to one of said tank receiver means interconnected by a flattened section;

elongated tank support means for mounting said tank receiver means to said brackets;

curved adapter means which extend between said arcuate sections of said brackets and are adapted to mount onto a SCUBA backpack; and

strap means for retaining SCUBA tanks to said tank receiver means.

4,889,307
BOW HANGER
William Klansek, 769 Stafford St., Rochdale, Mass. 01543
Filed Feb. 13, 1989, Ser. No. 309,405
Int. Cl.[4] F41B *5/00*
U.S. Cl. 248—690 **2 Claims**

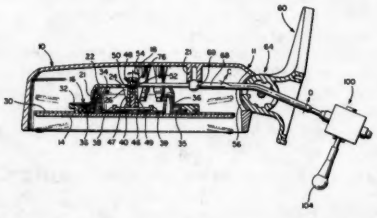


2. Bow hanger for use with an archery bow that has two limbs joined by a nut and bolt,

(a) a hook element having a U-shaped portion adapted to rest on a branch or the like and a straight spindle portion provided with a threaded portion at its free end,

(b) a base element of L-shaped configuration having a first flat leg with an aperture adapted to receive the said free end of the spindle, the base element having a second flat leg extending in a plane at a right angle to the plane of the first leg with a slot extending generally parallel to the said first leg, wherein the spindle is locked to the first flat leg of the base element by nuts engaging the threaded portion on either side of the first flat leg, and wherein the slot enters the second flat leg from an edge thereof to receive the bolt and nut that joins the limbs of the bow.

4,889,308
OUTSIDE REAR-VIEW MIRROR HAVING A MECHANICALLY ADJUSTABLE MIRROR GLASS
Jean-Luc Gillet, Collenberg, Fed. Rep. of Germany, assignor to Hohe KG, Collenberg, Fed. Rep. of Germany
Filed Nov. 12, 1987, Ser. No. 119,767
Int. Cl.[4] B60R *1/06*
U.S. Cl. 248—485 **8 Claims**



1. Outside rear-view mirror for a vehicle having a pedestal and a mirror housing which is swingably mounted to the pedestal, a backing member for a mirror glass being mounted to a universal joint including a rocker and being fastened to a base of the mirror housing, a handle adapted to be mounted within the interior of the vehicle and manipulatable in one or both of two transverse directions, and an adjustment device for adjusting the position of the mirror glass in response to a manipulation of the handle, said adjustment device including a flexible shaft, a first end of which is hung into the rocker projecting

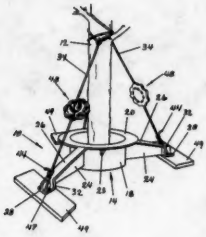
from the backing member transversely to the mirror glass and including a pinion engaging a toothed segment of the rocker, and a second end of which is fixedly coupled to a gear engaging a toothed rack which may be displaced longitudinally upon manipulating the handle, the toothed segment being supported on stands mounted to the mirror housing, and a rod intersecting transversely a segment which is journalled rotatably into aligned holes of projections from the backing element so as to form said universal joint, the rocker being formed as a shackle embracing laterally the toothed segment between the stands, the pinion being held rotatably by arms of said shackle.

4,889,309

CUT TREE STAND

James O. McCure, 4121 Browns La. D30, Louisville, Ky. 40220

Filed Jul. 11, 1988, Ser. No. 217,425
Int. Cl.[4] F16M *13/00*
U.S. Cl. 248—524 18 Claims



1. A stand of unitary construction for holding a decorative cut tree in an upright position comprising:

a bowl for receiving the bottom portion of the tree trunk, the bowl having a base wall upon which the cut end of the tree trunk rests, and a perimeter side wall integrally formed with the base wall, the base wall being convex as seen from the interior of the bowl;

three legs equally spaced apart from each other around the perimeter of the bowl, extending radially outwardly from the bowl side wall, and each leg is integrally formed at its proximal end with the bowl side wall;

a foot located proximate the distal end of each leg for contacting the floor upon which the tree is to be located, the sole of the foot being spaced a distance below the bottom longitudinal edge of the leg and a distance below the base wall of the bowl, the foot being integrally formed with the leg.

4,889,310

CONCRETE FORMING SYSTEM

Patrick E. Boeshart, R.R. 1, Box 134, Sioux City, Iowa 51108

Filed May 26, 1988, Ser. No. 199,995
The portion of the term of this patent subsequent to Aug. 23, 2005, has been disclaimed.
Int. Cl.[4] E04G *11/06*; E04B *2/84*
U.S. Cl. 240—41 11 Claims

1. An improved concrete forming system, comprising:

a series of opposed first and second polystyrene panels connected in opposed, parallel, spaced-apart relationship;

said first panels stacked on top of one another and also disposed in end-to-end relationship;

said second panels stacked on top of one another and also disposed in end-to-end relationship;

said first and second panels having an inwardly-disposed surface, an outwardly-disposed surface, upper and lower edges, and vertical side edges;

said first panels having a smooth inwardly disposed surface for resisting adhesion to concrete poured between said first and second panels;

said first panels having means on their upper and lower edges and opposite vertical edges for interlocking identical first panels in engagement with one another;

said second panels having means on their upper and lower edges and opposite vertical edges for interlocking identical second panels in engagement with one another;

tie slots in said first and second panels positioned in longitudinally spaced rows along said upper and lower edges;

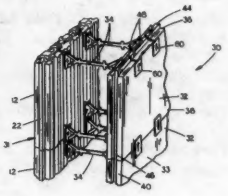
synthetic plastic ties arranged in vertically-spaced horizontally-extending rows and having opposite tie ends engaged in said tie slots;

said ties including an elongated strap having a pair of diverging legs at each end;

each said tie end having an inner and an outer paddle-member in spaced-apart, parallel, relation and connected by at least two leg members, said inner and outer paddle members spaced a distance apart to retain the thickness of a panel therebetween, said paddle members being oriented perpendicular to said elongated strap;

said tie slots in said second panel being in the shape of a "T", and the outer paddle and leg members of said ties also forming a "T" shape, so that either tie end may be retainingly engaged in the T-shaped tie slots of said second panels;

said tie slots in said first panels being straight and cut completely through the thickness thereof, so that the inner and outer paddle of a tie end will retain the panel thickness



therebetween and the tie leg members will be engaged in said tie slot;

said tie slots in said first and second panels being positioned directly opposite each other along upper and lower edges and in equidistant longitudinal arrangement such that said first panels can be interchanged with one another, said second panels can be interchanged with one another, and said first and second panels will have directly oppositely disposed tie slots;

end panel means for retaining concrete between said panels and said end panels;

said tie ends in said second panels being permanently secured in embedded position in said panels to permanently retain said second panels in position when concrete is poured and hardened between said first and second panels to thus provide an insulated concrete wall with synthetic plastic panels permanently attached to the exterior of one side of said wall;

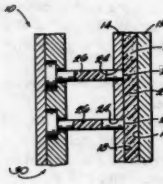
said outer paddle of said tie ends in said first panels being disposed outwardly of said panels, said legs between said inner and outer paddles being of a material adapted to be easily broken by a sharp vertical blow to said outer paddle, such that said first panels may be removed from a hardened concrete wall formed between said first and second panels, said diverging legs of said tie being of a material adapted to be easily broken by a sharp vertical blow to said inner paddle, such that the hardened concrete wall formed between said first and second panels may be exposed by removing said outer paddle, said first panel, and said inner paddle.

4,889,311

MOLDING APPARATUS WITH IMPROVED EJECTOR PIN

Willie R. Anglin, Burnsville, N.C., assignor to Outboard Marine Corporation, Waukegan, Ill.

Filed Aug. 10, 1988, Ser. No. 230,793
Int. Cl.[4] B22D *17/22*; B29C *45/40*
U.S. Cl. 249—68 13 Claims



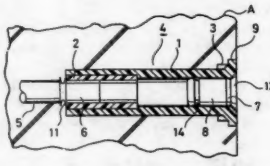
1. A molding apparatus comprising a mold piece having therein an aperture and including a surface at least partially defining a mold cavity, said mold piece being made of a first material, an ejector pin slideably housed in said aperture and made of second material substantially softer than said first material, and means for moving said ejector pin relative to said mold piece so that said ejector pin separates a molded part from said mold piece surface.

4,889,312

WATERSTOP FOR CONCRETE FORM SEPARATOR

Sunoo Ogou, Ogoori; Shigemichi Ishii, Tosu; Sadaaki Tagomori, Ogoori; Takuo Fukushima, Yachiyo, and Yasumasa Hayashida, Ageo, all of Japan, assignors to Asahi Denka Kogyo Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP87/00869, § 371 Date Jul. 5, 1988, § 102(e) Date Jul. 5, 1988, PCT Pub. No. WO88/03591, PCT Pub. Date May 19, 1988
PCT Filed Nov. 11, 1987, Ser. No. 233,661
Claims priority, application Japan, Nov. 11, 1987, 62-173717
Int. Cl.[4] E04G *17/08*
U.S. Cl. 249—216 6 Claims



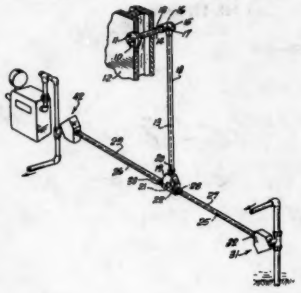
1. A waterstop for a concrete form separator, comprising:
(A) a terminal member including:
(1) a hollow cylinder of synthetic resin, having opposite ends, an interior, and an outer peripheral surface;
(2) a female threaded cylinder made of metal mounted in the interior at one end of said synthetic resin hollow cylinder; and
(3) a water-swollen damming-up outer ring mounted at the other end of said synthetic resin hollow cylinder and around the outer peripheral surface of said synthetic resin hollow cylinder and having sufficient thickness for preventing rainwater from penetrating into a gap defined between said synthetic resin hollow cylinder and a concrete structure;
(B) a separator member having a male threaded portion engaging with said female threaded cylinder of said terminal; and
(C) a plug mounted within the interior of said other end of said synthetic resin hollow cylinder, said plug having a water-swollen damming-up inner ring mounted thereabout and having a sufficient thickness for preventing rainwater from penetrating through a gap defined between said synthetic resin hollow cylinder and said plug.

4,889,313

UTILITY SHUTOFF METHOD AND DEVICE

Robert Sanchez, 11574 E. Beverly Blvd., Whittier, Calif. 90601

Filed Mar. 21, 1988, Ser. No. 170,772
Int. Cl.[4] F16K *31/46*
U.S. Cl. 251—74 6 Claims



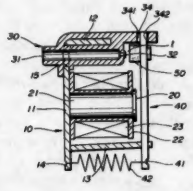
1. A device for turning off valves for utilities, such as gas and water, from a remote location in the event of an earthquake or other emergency, said device comprising:
a first spring loaded valve assembly having a valve, a valve seat and a valve stem, said valve and valve stem urged by biasing means toward a closed position where the valve is against the valve seat and holdable in an open position by a holding latch which holds the valve away from the valve seat;
a first hollow conduit having a first end and a second end, said first end being affixed to said valve assembly;
a hollow tee member affixed to said second end of said first hollow conduit;
a second hollow conduit having a first end and a second end, said first end being affixed to said hollow tee member;
a second spring loaded valve assembly affixed to said second end of said second hollow conduit, said second spring loaded valve assembly having a valve, a valve seat and a valve stem, said valve and valve stem urged by biasing means toward a closed position where the valve is against the valve seat and holdable in an open position by a holding latch which holds the valve away from the valve seat;
a third hollow conduit having a first end and a second end, said first end being affixed to said hollow tee member;
a first cable affixed at one end to the holding latch of said first valve assembly, said first cable passing from its point of attachment to said holding latch through said first hollow conduit into said hollow tee member;
a second cable affixed at one end to the holding latch of said second valve assembly, said second cable passing from its point of attachment to said holding latch through said second hollow conduit into said hollow tee member; and
a third cable affixed at one end to said first and second cables and extending from said hollow tee member through said third hollow conduit, said third cable having a pull handle on its other end whereby when the pull handle is pulled, the holding latches of said first and second spring loaded valve assemblies are released closing the first and second valves.

4,889,314

ELECTROMAGNETIC FLOW CONTROL VALVE FOR PRESSURE CONTROL OF THE LIKE

Yoshikazu Hashizume, and Haruo Kamiya, both of Kanagawa, Japan, assignors to Atsugi Motor Parts Company, Limited, Kanagawa, Japan

Filed Feb. 9, 1988, Ser. No. 153,964
Claims priority, application Japan, Feb. 10, 1987, 62-18161[U]
Int. Cl.[4] F16K *31/06*
U.S. Cl. 251—129.02 **7 Claims**



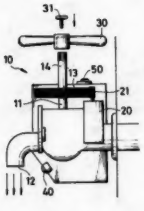
1. A valve comprising:
a first body in which a port is formed;
an electromagnetic device mounted on said body;
an armature, said armature being arranged to be movable toward and away from said port, said armature being proximate said electromagnetic device and arranged to move in a first direction when said electromagnetic device is energized;
a spring, said spring being connected with said armature in a manner to bias said armature in a second direction opposite said first direction;
a second body connected to said armature, said second body being arranged to engage said port in a manner to close the same when said armature is moved in one of said first and second directions; and
a stopper arrangement arranged to limit the movement of said armature in said first and second directions, said stopper arrangement comprises an aperture formed in a member extending from said first body, said aperture having first and second opposed edges, said armature being received in said aperture in a manner that when said electromagnetic device is energized and moves in said first direction said armature moves toward and engages said first edge, and when said electromagnetic device is de-energized said spring moves said armature in said second direction toward and into engagement with said second edge.

4,889,315

ELECTRICALLY OPENING AND CLOSING FAUCET DEVICE

Eisuke Imanaga, 4-19, Setagaya 1-chome, Setagaya-ku, Tokyo, Japan

Filed Nov. 28, 1988, Ser. No. 276,983
Claims priority, application Japan, Nov. 30, 1987, 62-301873
Int. Cl.[4] F16K *31/05, 51/00;* E03C *1/05*
U.S. Cl. 251—129.03 **3 Claims**



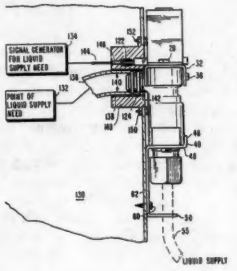
1. An electrically opening and closing faucet device having a valve, a spindle for rotating the valve and a handle attached to the spindle, comprising:
a follower gear securely attached to the spindle;
a shaft attached to the spindle, said handle being connected to the shaft so that the spindle can be manually turned to open and close the valve by rotating the shaft;
an electric motor having a motor gear, said motor gear engaging the follower gear so that when the electric motor is rotated, the spindle is turned to open and close the valve,
a sensor electrically connected to the electric motor, said sensor being situated adjacent to the valve so that only when a hand is detected by the sensor, the electric motor is actuated to turn on the valve for releasing water from the valve, and
switch means electrically connected to the electric motor, said switch means having a first switch for operating the electric motor to open the valve and a second switch for operating the electric motor to close the valve, said electric motor being actuated by the sensor and the switch means.

4,889,316

METHOD AND DEVICE FOR QUICK CONNECTION AND DISCONNECTION OF A SOLENOID OPERATED VALVE TO A REFRIGERATOR WITH AN ICEMAKER

William R. Donahue, Jr., West Lafayette, Ind., assignor to Emhart Industries, Inc., Indianapolis, Ind.

Filed Apr. 25, 1988, Ser. No. 185,786
Int. Cl.[4] F16K *27/00, 31/06;* F25C *5/18*
U.S. Cl. 251—129.15 **8 Claims**



1. An improved solenoid operated valve assembly for use with a refrigerator with an icemaker comprising;
a liquid supply connector in said refrigerator connected to the site of liquid requirement;
an electrical connector in said refrigerator connected to electrical liquid requirement indicator means for providing an electrical signal during the period when the refrigerator requires a liquid, said electrical connector being in a fixed spacial relationship to said liquid supply connector;
a valve body comprising:
a liquid supply intake connectable to a supply of liquid;
a liquid supply output connector designed and arranged to sealingly connect with said liquid supply connector of said refrigerator, said liquid supply output connector being connected to a fluid path connecting said output connector to said liquid supply intake;
a solenoid operated valve movably positioned in the fluid path to open and close said fluid path;
a second electrical connector electrically communicating with said solenoid operated valve so that an electrical signal received by said electrical connector will supply an impulse to cause said valve to selectively open and close said fluid path, said second electrical connector being electrically connectable to said first electrical connector, said second electrical connector being in a second fixed

spacial relationship to said liquid supply intake connector such that said second fixed spacial relationship is the same as said first fixed spacial relationship;

wherein said liquid supply connector is connected to said liquid supply output connector and said first electrical connector is connected to said second electrical connector; and

said device further comprising an attachment means for attaching said valve body to said refrigerator while simultaneously grounding said solenoid to said refrigerator and relieving strain on a line connecting said supply of liquid to said liquid supply intake.

4,889,317

PROPORTIONAL FLOW CONTROL VALVE

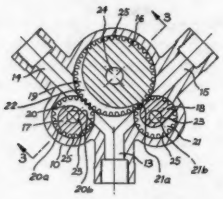
Christopher G. Kelsey, Sydney, Australia, assignor to Geoflow International Pty. Limited, Australia

Filed Sep. 27, 1988, Ser. No. 249,677

Claims priority, application Australia, Oct. 14, 1987, PI4871

Int. Cl.[4] F16K *11/00*

U.S. Cl. 251—212 **18 Claims**



5. A valve comprising first, second and third orifices and means controlling the cross-section of fluid flow between said first and second and said first and third orifices, said means comprising a first cylinder mounted for rotation about its axis, a second cylinder mounted for rotation about its axis and having its periphery in sealing contact with that of the first cylinder at a region between the first and second orifices, a third cylinder mounted for rotation about its axis and having its periphery in sealing contact with that of the first cylinder at a region between the first and third orifices, said axes being parallel, wherein the periphery of the first cylinder has a circumferentially extending groove, the depth of which increases from one end thereof to a point of maximum depth and decreases from said point to the other end thereof.

4,889,318

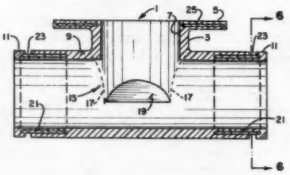
MOLDED HOPPER TEE

David E. Sisk, R.R. #1, Box 340, Bonne Terre, Mo. 63628

Continuation-in-part of Ser. No. 186,104, Apr. 25, 1988, Pat. No. 4,848,396, which is a continuation-in-part of Ser. No. 817,584, Jan. 10, 1986, Pat. No. D. 297,678. This application Dec. 5, 1988, Ser. No. 279,718

Int. Cl.[4] F16K *51/00*

U.S. Cl. 251—356 **5 Claims**



1. A molded hopper tee including, a first generally vertically directed hollow pipe section having a laterally outwardly directed flange at an upper end thereof for attachment to the bottom of a hopper or the like, a second hollow pipe section extending generally transversely to said first hollow pipe section and being integrally attached to said first hollow pipe section at a lower end thereof, said second hollow pipe section extending on opposite sides beyond the first hollow pipe section and terminating at opposite free ends for attachment to pipeline tubing or the like, said integral first and second hollow pipe sections being integrally molded from a rigid and durable polymer material, the opposite free ends of said second hollow pipe section each having at least one circumferentially extending metal reinforcing element connected adjacent each said free end, the laterally outwardly directed flange at an upper end of said first hollow pipe section also including at least one metal reinforcing element connected thereto so as to extend in the same direction as said laterally outwardly directed flange, at least one reinforcing element int he laterally outwardly directed flange comprises at least one flat washer-shaped member which extends for substantially the entire length of, but which terminates short of, opposite inner and outer marginal areas of said laterally outwardly directed flange, said at least one washer-shaped element circumferentially supporting said first hollow pipe section adjacent the upper end thereof, and a pair of metal reinforcing rings adjacent and upper and lower surface of said laterally outwardly directed flange.

4,889,319

BAKEABLE VACUUM SYSTEMS

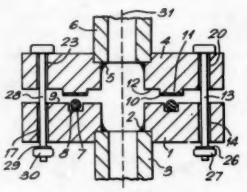
Robert B. Phillips, Horsham, and Paul R. Stonestreet, Newport Pagnall, both of England, assignors to VG Instruments Group Limited, Crawley, England

Filed Jun. 3, 1988, Ser. No. 202,692

Claims priority, application United Kingdom, Jun. 5, 1987, 8713241

Int. Cl.[4] F16K *51/02*

U.S. Cl. 251—368 **6 Claims**



1. A bakeable sealing means comprising: a first sealing element composed substantially of an elastomeric material; a second sealing element comprising PTFE; and means for engaging said first sealing element with said second sealing element and for compressing said first sealing element prior to baking whereby said sealing means is baked with said sealing elements in engaged condition and with said first sealing element in a compressed state.

4,889,320

APPARATUS FOR DETACHABLY CLAMPING, TENSIONING AND SECURING ROPES, CABLES, WIRES, BELTS OR THE LIKE

Max Pasbrig, Orselina, Switzerland, assignor to Lacrex Brevetti S.A., Orselina, Switzerland

Filed Jun. 22, 1988, Ser. No. 209,831

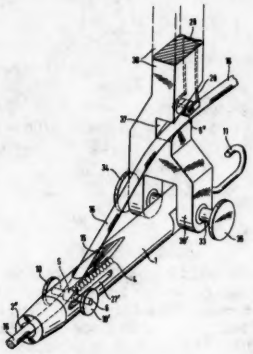
Claims priority, application Fed. Rep. of Germany, Jun. 22, 1987, 8708661

Int. Cl.[4] B66F *3/00*

U.S. Cl. 254—252 **8 Claims**

1. Apparatus for detachably clamping, tensioning and secur-

ing ropes, cables, wires, belts and the like comprising: a thick-walled housing with a longitudinal hole with an end orifice, which longitudinal hole runs in the axial direction of the housing, and a spring-loaded clamping unit axially displaceable in the longitudinal hole, the housing having an oblique hole that obliquely opens into the longitudinal hole, the clamping unit clamping in the longitudinal hole a rope fed through the end orifice of the longitudinal hole and emerging through the oblique hole, the clamping unit having opposite sides with an axial projection on each of its opposite sides, the housing having guide slots located opposite one another, through which the axial projections extend to guide the clamping unit, the ends of the axial projections forming handles that pass through and extend beyond the housing and serve for displacing the clamping unit, the clamping unit comprising a front roller and a rear roller and a bearing part connecting the rollers one behind the other with the front roller located between the end orifice and the rear roller the diameter of the front roller being smaller than the diameter of the rear roller and the axial projections being provided on the larger rear roller.

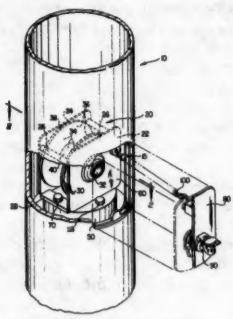


4,889,321

APPARATUS FOR ROTATABLY MOUNTING A WINCH WITHIN AN ENCLOSURE

Russell W. Burns, Farmers Branch, Tex., assignor to Concord Industries, Inc., Addison, Tex.

Filed Jun. 6, 1988, Ser. No. 202,515
Int. Cl.[4] B66D *1/00*
U.S. Cl. 254—332 **8 Claims**



1. An apparatus for a rotatably mounting a winch within a flagpole comprising:

a housing comprising a portion of said flagpole having an access opening therein, said access opening being of sufficient size to allow removal of said winch from within said housing;

a first platform comprising a disc-like plate attached to the housing in a fixed position with a central opening and at least one peripheral opening;

a second platform comprising a disc-like rotatable plate having a central smooth-faced opening and a plurality of peripheral openings with at least one such peripheral opening extending completely through said platform;

a winch mounted to the second platform;

means for securing the second platform against rotation with reference to the first platform comprising a fastener extending through one of said peripheral openings of the second platform and into the peripheral opening of the first platform;

means for detachably mounting the winch to said second platform; and

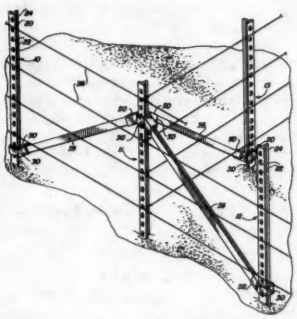
coupling means for attaching the first and second platforms in such a manner that the second platform rotates with respect to the first platform.

4,889,322

POST BRACE APPARATUS AND SYSTEM

Kenneth A. Wagner, Rio Rico, Ariz., assignor to Product Concepts, Inc., Rio Rico, Ariz.

Filed Oct. 12, 1988, Ser. No. 256,451
Int. Cl.[4] E04H *12/22, 12/20*
U.S. Cl. 256—36 **24 Claims**



1. A post brace system for bracing first and second substantially vertical posts spaced apart a predetermined distance, said system including in combination:

first collar means releasably mounted on said first post;

second collar means releasably mounted on said second post;

rigid cross-brace means having a length at least sufficient to extend across said predetermined distance; and

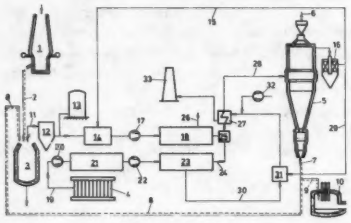
slip-fit means for releasably securing said cross-brace means at opposite ends thereof to said first and second collar means without additional fasteners to cause said cross-brace means to extend between said first and second collar means.

4,889,323

MILL ARRANGEMENT WITH PRIMARY GAS MIXING MEANS

Hermann Pusch, Leonding; Siegfried Zeller, Linz; Konstantin Millionis, Graz, and Hans Kresl, Linz, all of Austria, assignors to Voest-Alpine Aktiengesellschaft, Austria

Filed Jul. 30, 1987, Ser. No. 79,673
Claims priority, application Austria, Aug. 7, 1986, 2139/86
Int. Cl.[4] F27B *19/04*
U.S. Cl. 266—142 **7 Claims**



1. A mill arrangement for producing steel from liquid and solid charging substances comprising:

(a) coke oven gas supply means;

(b) fractionating means including hydrogen-rich gas withdrawal means and hydrocarbon-rich gas withdrawal means,

(c) a blast furnace including molten pig iron withdrawal means;

(d) a steelworks converter including charging inlet and converter offgas withdrawal means;

(e) a direct iron ore reduction plant including sponge iron withdrawal means and top gas withdrawal means;

(f) means for transporting molten pig iron from said blast furnace withdrawal means to said steelworks converter;

(g) means for transporting sponge iron from said reduction plant sponge iron withdrawal means to said steelworks converter;

(h) primary gas mixing means including means for withdrawing mixed gases;

(i) means for transporting coke oven gas from said coke oven gas supply means to said fractionating means;

(j) means for transporting hydrogen-rich gas from said hydrogen-rich gas withdrawal means of said fractionating means to said primary gas mixing means;

(k) means for transporting converter offgas from said converter offgas withdrawal means to said primary gas mixing means;

(l) means for transporting top gas from said top gas withdrawal means of said direct iron ore reduction plant to said primary gas mixing means; and

(m) means for transporting mixed gases from said primary gas mixing means to said direct iron ore reduction plant.

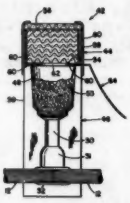
4,889,324

EXOTHERMIC WELDING APPARATUS AND METHOD

Denis A. Brosnan, Solon; James E. Whetsel, Bedford; Richard E. Singer, Beachwood; Mark V. Samas, Euclid; Michael D. Amos, Burton, and David P. Kovarik, Eastlake, all of Ohio, assignors to Erico International Corporation, Solon, Ohio

Continuation-in-part of Ser. No. 30,169, Mar. 25, 1987, abandoned. This application Dec. 4, 1987, Ser. No. 128,597
Int. Cl.[4] C21D *1/00*
U.S. Cl. 266—157 **34 Claims**

1. A thermite reaction containment vessel for reacting thermite reaction material therein which upon ignition produces molten metal and evolves spatter, hot gases, hot particulate matter, and radiated heat comprising filter means for containing such radiated heat and collecting such spatter and particulate matter while allowing such hot gases to exit said containment vessel, said filter means comprising a primary filter of one material and a secondary filter of another material, said primary filter being positioned between the thermite reaction material and said secondary filter to protect said secondary filter from the heat and spatter of the reaction.

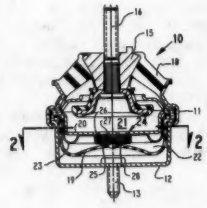


4,889,325

FLUID FILLED VIBRATION ISOLATOR

Wallace C. Flower, McKean, and Richard P. Thorn, Erie, both of Pa., assignors to Lord Corporation, Erie, Pa.

Filed Aug. 15, 1988, Ser. No. 231,918
Int. Cl.[4] F16F *9/00, 13/00*; B60K *5/12*
U.S. Cl. 267—140.1 **7 Claims**



1. A vibration isolating device comprising a housing with at least one flexible wall portion movable in response to vibrations imparted thereto, a partition dividing the housing into at least two chambers for containing a working fluid displaceable in response to movement of the flexible wall, an inertia track passageway providing fluid communication between the chambers, and decoupling means cooperable with the inertia track passageway to control fluid flow between the chambers, the decoupling means comprises:

a singular compartment having a plurality of ports fluidly interconnecting said chambers,

a plurality of wafers contained within said singular compartment occupying less than said volume of the compartment and loosely contained in said compartment for providing therethrough a fluid flow path having a variable resistance to flow between the chambers and each of said plurality of wafers, each of the wafers being in a contiguous relationship to an adjacent wafer,

said plurality of wafers being displaceable by said fluid between a dispersed condition substantially disengaged from said compartment to provide low resistance to fluid flow between the chambers and a compacted condition engaged with said compartment to provide high resistance to fluid flow between the chambers,

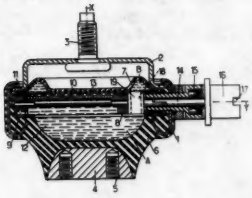
whereby the plurality of wafers cooperated with the compartment and fluid to couple and decouple the inertia track passageway without generating audible noise.

4,889,326

HYDRAULIC ANTIVIBRATORY SUPPORTS

Jean-Paul Bouhours, Arrou, France, assignor to Hutchinson, Paris, France

Filed Jun. 27, 1988, Ser. No. 211,932
Claims priority, application France, Jul. 1, 1987, 87 09320
Int. Cl.[4] F16F *15/04;* F16M *13/00*
U.S. Cl. 267—140.1 4 Claims



1. An antivibratory device which is disposed between two rigid elements for support and damping purposes comprising:

a sealed case including

(a) a rigid base (4) fixable to one of the rigid elements,

(b) a rigid ring (1) fixable to the other rigid element,

(c) a resilient annular supporting wall (6) sealingly connecting said base to said ring, and

(d) a flexible membrane (7) connected sealingly to said ring whereby an inside of said case is formed between said annular supporting wall and said flexible membrane; an intermediate dividing wall (8) dividing the inside into a work chamber (A) adjacent said annular supporting wall and a compensation chamber (B) adjacent said membrane, said dividing wall including a movable valve portion (10) which is movable along an axis of movement;

a restricted passage (9) which forms a permanent communication between said chambers;

a liquid mass (12) which fills said chambers and said restricted passage;

a first stop means (11) for restricting the movement of said movable valve portion in one direction along the axis of movement thereof; and

a second stop means for restricting the movement of said movable valve portion in an opposite direction along the axis of movement thereof whereby said movable valve portion is restricted to an amplitude of movement by said first and second stop means, said second stop means including

(a) a rotary cam (13) immersed in the liquid in one of said chambers adjacent said movable valve portion and having an offcenter axis of rotation which is oriented in a direction perpendicular to the axis of movement of said movable valve portion whereby an angular position of said rotary cam determines an allowable amplitude of movement of said movable valve portion from a minimum valve to a maximum valve, and

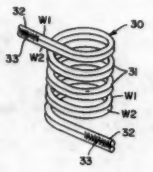
(b) a rod (14) coupled to said rotary cam and passing through a seal in a wall of the one said chamber in which said rotary cam is provided, whereby a rotation of said rod causes a rotation of said rotary cam and a variation in the allowable amplitude of movement of said movable valve portion.

4,889,327

MULTIPLE-STRAND TORSION SPRING

Peter G. Seyler, Franklin Park, Ill., assignor to Perfection Spring & Stamping Corp., Mt. Prospect, Ill.

Division of Ser. No. 168,377, Mar. 15, 1988, Pat. No. 4,821,390.
This application Nov. 21, 1988, Ser. No. 274,336
Int. Cl.[4] F16F *1/06*
U.S. Cl. 267—168 2 Claims



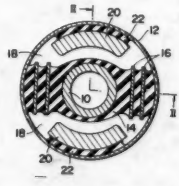
1. A helical torsion spring comprising a plurality of spring wires disposed in parallel, contiguous relation and arranged in a helix composed of a series of coaxial coils; said wires being unconnected and free for limited movement relative to each other along a major portion of the length of said coils; each of said wires including a pair of end portions at opposite ends of said helix; said end portions of all of said wires at both ends of said helix being welded together.

4,889,328

INSULATOR FOR USE IN AUTOMOTIVE SUSPENSION OR THE LIKE

Takaaki Uno; Hiroshi Yamahata, both of Zama, and Kazuo Chiba, Isehara, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jun. 11, 1984, Ser. No. 619,482
Claims priority, application Japan, Jul. 6, 1983, 58-122980
Int. Cl.[4] F16F *7/00;* F16M *13/00*
U.S. Cl. 267—293 4 Claims



1. An insulator for supporting a structural member subject to vibration on a chassis comprising:

a first member connected to one of said structural member and said chassis;

a second member connected to the other of said structural member and said chassis;

a first elastomeric body interconnecting said first and second members;

a first mass, and

a second elastomeric body which is separate from said first elastomeric body and which interconnects said first mass and one of said first and second members, said first mass and said second elastomeric body defining means for suppressing the transmission of vibration from said structural member to said chassis;

wherein said first and second members are coaxially arranged tubular members which are interconnected by said first elastomeric body, said first elastomeric body being shaped so as to define a space between it and said outer of the two coaxially arranged tubular members, said first mass being disposed in said space; and

wherein said first elastomeric body is shaped so as to define two symmetrical spaces within the outer of two coaxially arranged tubular members and wherein a second mass is disposed in the second space and connected with one of said first and second tubular members through a third elastomeric body, said second mass and said third elastomeric body defining second means for suppressing the transmission of vibration from said structural member to said chassis.

4,889,329

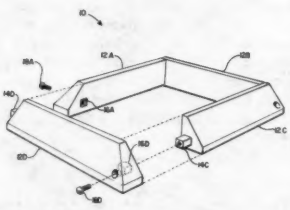
SELF-ALIGNING POST CUTTING JIG

Joel C. Smith, Jr., 3816 Denman Dr., Apex, N.C. 27502

Filed Aug. 31, 1988, Ser. No. 238,908

Int. Cl.[4] B25B *3/00*

U.S. Cl. 269—2 **10 Claims**



1. A self-aligning cutting jig for four-sided posts comprising four elongate cutting guide members each having a plurality of flat side walls including an inner wall for placement in abutting relationship to a corresponding post side and an outer wall, said guide members each having adjustable fastening means at opposing ends thereof for securing said four guide members together in a closed four-sided configuration having four adjustable corners wherein no guide member overlaps beyond the outer wall of an adjacent guide member, said guide members defining a single plane wherein the longitudinal axes of the opposing sides are parallel and the longitudinal axes of the adjacent sides are perpendicular, said fastening means being positioned within a cross-sectional profile of said guide members and adapted at each of said four corners to provide a first securement mode wherein the ends of said guide members are spaced-apart each from the other to facilitate slidable placement onto a post to be cut and a second securement mode wherein the ends of said guide members are brought into said non-overlapping contact to facilitate fixed engagement of the post and to provide a straight cutting guide thereon, whereby a tool directed along an outer perimeter of the jig encounters no obstacles.

4,889,330

TROWEL VISE

Gregory D. McSwain, 3341 California Rd., Okeana, Ohio 45053

Filed Jan. 25, 1988, Ser. No. 147,550

Int. Cl.[4] B23Q *3/00*

U.S. Cl. 269—95 **4 Claims**

1. A vise for use in re-shaping a tool blade, comprising:

(a) an angle bar, having an L-shaped cross-section, said bar having a plurality of spaced-apart holes through one leg of said L-shaped cross-section;

(b) a flat bar of approximately equal length with said angle bar, and having a like plurality of spaced-apart holes;

(c) a reference edge along one of said bars; and

(d) a pair of clamping fasteners, the first fastener maintained at a constant location, passing through said bars, and the second fastener being adjustably positionable along said bars relative to said first fastener, so that said fasteners are proximal to opposite sides of a tool blade sandwiched between said bars.

4,889,331

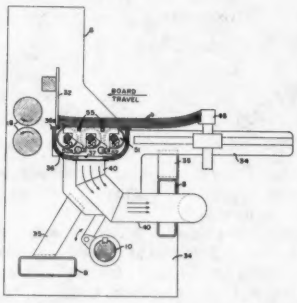
ROTARY-TYPE FEEDER MACHINES AND METHODS

Louis M. Sardella, Cockeysville, Md., assignor to Prime Technology, Inc., Hunt Valley, Md.

Continuation of Ser. No. 674,294, Nov. 23, 1984, abandoned. This application Dec. 1, 1986, Ser. No. 936,953

Int. Cl.[4] B65H *5/06*

U.S. Cl. 271—11 **21 Claims**



1. In an apparatus for feeding corrugated boards and the like from beneath a stack behind a gate and wherein the articles are individually fed under the gate along a generally horizontal path; the improvement comprising: rotatable feed members movable in a first direction to engage and move the lowermost article in the stack towards said gate and along said path, said feed members being movable in a second direction opposite to said first direction for urging the lowermost article away from said gate, without bending the article, prior to movement of the article under the gate, means for driving said feed members in both of said first and second directions, means for causing said feed members to come into and out of contact with the stack and wherein said feed members have surfaces frictionally engageable with the underside of the lowermost article to move the article through frictional engagement therewith along said path and under said gate upon movement of said feed members in said first direction, the stack remaining in a relatively fixed horizontal position during the movement of said lowermost article and said feed members in both said first and second directions.

4,889,332

DOCUMENT FEEDING APPARATUS

Antony J. Leonard, West Lothian, and Donald A. Macleod, Renfrewshire, both of Scotland, assignors to Unisys Corporation, Blue Bell, Pa.

Filed May 3, 1988, Ser. No. 189,922

Claims priority, application United Kingdom, Feb. 15, 1988, 8803381

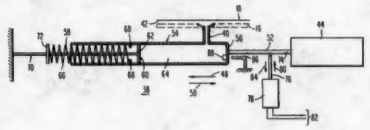
Int. Cl.[4] B65H *3/08*

U.S. Cl. 271—108 **15 Claims**

1. An apparatus for feeding individual documents in a first direction from the base of a stack of documents comprising:

pneumatic vacuum means including a movable body member having opposed extremities, said body member being closed at least at one extremity, a fixed piston disposed within said body member, such that a main chamber is formed between said body member and said piston, a pneumatic suction head affixed to said body member and operative to grasp a face of a document at the base of the stack when air is induced to enter therein;

a first motive means, coupled to move said body member



and said head in a first stroke in a second direction opposite to said first direction, said movement of said body member in said second direction causing the expulsion of air from said main chamber;

and a second motive means independent of said first motive means, said second motive means being coupled to move said body member and said head thereafter in a second stroke in said first direction, said movement of said body member in said first direction causing the induction of air through said suction head into said main chamber.

4,889,333

CONVEYING APPARATUS FOR PAPER PRODUCTS, IN PARTICULAR IN STREAM FORM

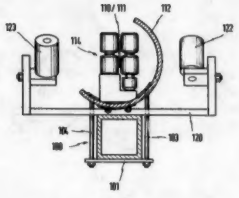
Hagen Gämmerler, D-8021 Icking, Ichoring 44, Fed. Rep. of Germany

Filed Feb. 25, 1988, Ser. No. 160,275

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1987, 3707540; Sep. 16, 1987, 3731151

Int. Cl.[4] B65H *5/02*

U.S. Cl. 271—272 **5 Claims**



1. A conveying apparatus for paper products wherein endless belts are guided so as to propagate the products, the apparatus having adjustable features to provide for guiding endless belts so as to turn the propagated products about the propagation axis, comprising a plurality of conveying assemblies, each assembly comprising a housing having two parallel, spaced-apart shafts attached thereto, and rotatable rollers on each shaft, spaced apart sufficiently to guide products therebetween; an elongate plate having a transverse curvature, and a plurality of transverse slots extending at least partially along said transverse curvature; and means for adjustably mounting each of said plurality of conveying assemblies to said elongate plate in predetermined positions along said transverse slots.

4,889,334

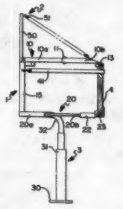
DEVICE FOR SAFELY SECURING BOARDS FOR MARTIAL ARTS ACTIVITIES

Loren G. Partlo, 3408 Shaffer, Coleman, Mich. 48618

Filed Oct. 28, 1987, Ser. No. 113,498

Int. Cl.[4] A63B *69/00*

U.S. Cl. 272—76 **15 Claims**



1. A device for securing boards for martial arts activities, comprising:

means for securely holding at least one board to be broken;

said holding means comprising frame portions arranged to define therebetween a board-holding space wherein said board is secured;

release means operably cooperating with said frame portions so as to move at least one of said frame portions in an outward direction relative to said board-holding space when said board is struck to be broken, whereby the size of said board-holding space is enlarged,

said device is portable; and

a supporting stand adapted to rest on a ground or floor surface so as to support said holding means at a predetermined level above said surface,

said frame portions comprise an adjustable first frame portion and an adjustable second frame portion, said first and second frame portions being connected at rear ends thereof with an attachment frame portion which supports said first and second frame portions in spaced relation to each other so as to define said board holding space, whereby the legends of said first and second frame portions may be adjusted to accommodate various numbers of boards.

4,889,335

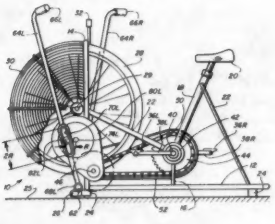
COMPOUND BICYCLE EXERCISING APPARATUS

Pao-Chaing Chen, Taichung, Taiwan, assignor to Diversified Investments Corporation, Madison, Wis.

Filed Oct. 28, 1988, Ser. No. 264,094

Int. Cl.[4] A63B *21/00*; F16H *21/18*

U.S. Cl. 272—73 **12 Claims**



1. An exercise bicycle, comprising:

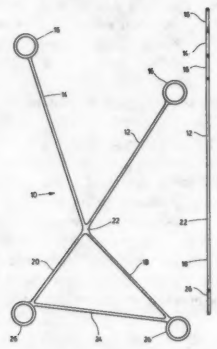
(a) a frame carrying for rotation a first shaft, a second shaft, and a third shaft;

(b) energy absorbing means rotated on said frame about said first shaft;
(c) first connecting means for free wheeling said second shaft using at least one foot pedal;
(d) second connecting means for rotatably connecting said first shaft and said second shaft;
(e) eccentric wheel means for rotating one roller mounted thereon in a predetermined circular orbit relative to said third shaft;
(f) third connecting means for rotatably connecting said third shaft to free wheel said second shaft;
(g) an arm which is pivotally mounted at one end to said frame and which has an opposite end which is adapted to be pulled by the human hand; and
(h) yoke means, carried by said arm at a location intermediate said ends of said arms, for coupling said arm to said one roller such that reciprocating motion of said arm is transferred to rotation said second shaft, said yoke means having one aperture into which said one roller is confined to orbit said third shaft.

4,889,336
EXERCISE DEVICE

Simon Schneiderman, 473 Sackville Avenue, Toronto, Ontario, Canada M4X 1T5

Filed Nov. 29, 1988, Ser. No. 277,205
Int. Cl.[4] A63B *21/02*
U.S. Cl. 272—137 **9 Claims**



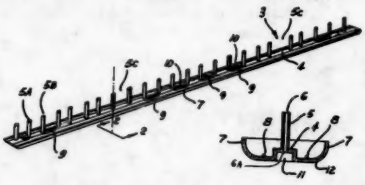
1. A martial arts development device comprising:
first and second arm cords:
hand attachments at the free ends of said arm cords;
longitudinal leg cords;
foot attachments at the free ends of said leg cords;
junction means connecting said arm cords and said leg cords at a junction point; and,
a transverse foot cord extending between the free ends of said leg cords, and wherein said arm cords, said leg cords, and said foot cord are formed of an elastomeric material.

4,889,337
RACQUET SHOCK ABSORBING DEVICE

Barry A. H. Todd, Mosman, Australia, assignor to Fin Sports Limited, Aylesbury Bucks, England

Continuation of Ser. No. 918,216, Oct. 14, 1986, abandoned. This application Mar. 30, 1989, Ser. No. 331,033
Claims priority, application Australia, Jun. 3, 1988, PH2864
Int. Cl.[4] A63B *49/14*
U.S. Cl. 273—73 D **3 Claims**

1. A shock absorbing device for a racquet formed in part by a head having an outer edge that includes string holes, comprising a strip of resilient material that includes a central longitudinally extending spine having a racquet engaging face, and an outer face, a plurality of apertures through the spine alignable with the string holes in a racquet head, longitudinally extending integral beading located along either side of the spine for at least partial covering of the outer edges of the racquet head, and one or more resilient protuberances formed along the beading for cushioning impact forces directed onto the racquet head by creating a shock absorbing gap between

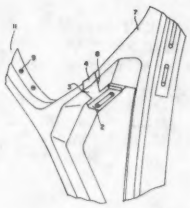


said strip and a racquet head, wherein one or more recesses are formed in the outer face of said spine, the recesses extending between two or more of said apertures and being longitudinally spaced from said interruptions in the racquet engaging face of the spine in order to avoid the weakening of the spine which would otherwise occur if the recesses and interruptions coincided.

4,889,338
RACKET FRAME

Hayashi Keijiro, Takatsuki, Japan, assignor to Mizuno Corporation, Osaka, Japan

Filed Dec. 17, 1987, Ser. No. 134,079
Claims priority, application Japan, Dec. 29, 1986, 61-310927
Int. Cl.[4] A63B *49/06*
U.S. Cl. 273—73 G **3 Claims**



1. A racket frame comprising a divided yoke portion, said yoke portion having a notched portion therein, said notched portion having an elastic insert therein in contact with said yoke portion, said elastic insert having a microencapsulated perfume thereon, and wherein said yoke portion and said elastic insert are so arranged that perfume is released when said elastic insert is subjected to pressure from said yoke portion.

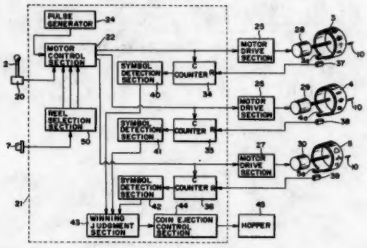
4,889,339
SLOT MACHINE

Kazuo Okada, Tokyo, Japan, assignor to Kabushiki Kaisha Universal, Tochigi, Japan

Continuation of Ser. No. 670,993, Nov. 13, 1984, abandoned. This application May 7, 1986, Ser. No. 861,736
Claims priority, application Japan, Nov. 14, 1983, 58-174765[U]
Int. Cl.[4] A63B *71/06*
U.S. Cl. 273—143 R **4 Claims**

1. In a slot machine of the type in which a plurality of symbol columns are moved and sequentially stopped, and when stopped and a winning combination of symbols occurs on a winning line a predetermined number of coins is paid out, the improvement comprising:
a single stop button manipulable by a player for stopping one

after another said plurality of symbols columns in a predetermined sequence such that a first manipulation by a player will stop one of said plurality of symbol columns, and each subsequent manipulation will stop a different one of said plurality of symbol columns until the entire said plurality of symbol columns is stopped;



selection means internal to the machine for selecting each of said plurality of moving columns to be stopped, responsive to the cumulative number of manipulations of said stop button; and

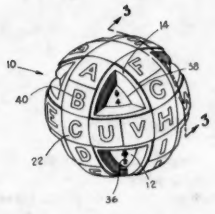
stop means for stopping each of the said plurality of symbol columns selected by said selection means, said stop means operating responsive to said selection means.

4,889,340

SPHERICAL PUZZLE

Wilton R. Greene, 462 W. Hayne St., Woodruff, S.C. 29388

Continuation-in-part of Ser. No. 673,276, Nov. 20, 1984, abandoned. This application Sep. 10, 1986, Ser. No. 907,845
Int. Cl.[4] A63F *9/08*
U.S. Cl. 273—153 S **30 Claims**



14. A manipulative game, comprising:

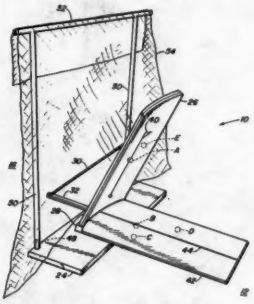
a plurality of track members joined together in substantially parallel alignment with one another to form a predetermined shape; said plurality of track members including a first track member and a second track member; said first track member being movable relative to said second track member; track means provided between said plurality of track member for allowing said first track member to be movable about a plurality of planes relative to said second track member; retention means including means engaging and movable relative to said track means for holding said plurality of track members in substantially parallel alignment with one another through engagement with said track means as said first track member is moved relative to said second track member; and means for disassembling said manipulative game through movement of said track members to a predetermined configuration with respect to said retention means.

4,889,341

GOLF SWING ANALYZER

Grant W. Walker, 8830 Madison, Fair Oaks, Calif. 95628

Filed Dec. 15, 1988, Ser. No. 284,723
Int. Cl.[4] A63B *69/36*
U.S. Cl. 273—176 F **20 Claims**



17. A portable golf swing analyzer kit for use on an elongated level surface in a limited space defining a practice range, said range having proximal and distal ends, comprising in combination:

a. tee means removeably adherable to said surface at the proximal end of said practice range;

b. a rigid, substantially planar target disposed upon a base and tilted toward said tee means at the proximal end of said range when said base is placed on said level surface at the distal end of said range; and,

c. a rigid, planar rebound board adapted to disposed upon said level surface between said tee means and said target board for receiving and being marked by a powder-carrying practice golf ball driven from said tee means and rebounding from said target.

4,889,342

ALL-WEATHER GOLF DRIVING RANGE

Harvey W. Hugunin, 302 Hurlburt Rd., Syracuse, N.Y. 13224

Filed Jul. 26, 1988, Ser. No. 224,385
Int. Cl.[4] A63B *69/36*; F24F *9/00, 13/00*
U.S. Cl. 273—176 R **5 Claims**

1. A stall-type enclosure for use by a golfer at a driving range during inclement weather, said enclosure comprising:

(a) a roof and side, back and front walls, said front wall having an opening through which a ball may be driven by a golfer standing within said enclosure and executing a full swing;

(b) a floor within said enclosure elevated above ground level to provide an enclosed space beneath said flooring;

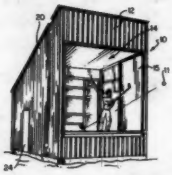
(c) an air plenum positioned within said enclosed space, said plenum having an open top of first, predetermined outline;

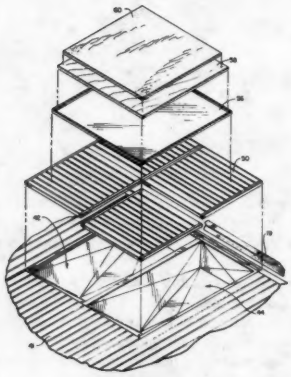
(d) means providing heated air to said plenum;

(e) a predetermined section of said flooring comprising an open grating, at least a portion of which is positioned directly above said open top of said plenum, in fully covering relation thereto; and

(f) a mat adapted for supporting said golfer and ball, said mat being positioned upon said portion of said open grating

and having a second, predetermined outline, smaller than said first outline, whereby said heated air may rise through





said open grating in an area at least partially surrounding said mat.

4,889,343

GOLF SWING TRAINER

Thomas F. Nielsen, Albuquerque, N. Mex., assignor to N & S Ltd., Albuquerque, N. Mex.

Filed Nov. 15, 1988, Ser. No. 271,435

Int. Cl.[4] A63B *69/36*

U.S. Cl. 273—186 A **8 Claims**

1. A golf swing training club, comprising:

a handle portion having a longitudinal axis;

a shank portion having a shaft, the shaft having an axis, and at least one weight connected to the shaft and off-set from the axis thereof; and

connecting means pivotably connecting the handle portion and the shank portion so that the shank portion can pivot around the longitudinal axis of the handle portion in response to an improper swing, but said pivot will not occur if a proper swing is executed.

4,889,344

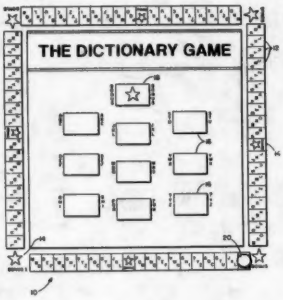
DICTIONARY GAME

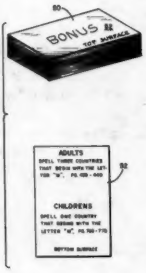
Kenneth P. Zimba, 19860 Lakeview Ave., Excelsior, Minn. 55331

Filed Nov. 2, 1988, Ser. No. 266,003

Int. Cl.[4] A63F *3/00*

U.S. Cl. 273—243 **8 Claims**





4. A dictionary game comprising:

(a) a dictionary;

(b) a plurality of decks of question cards, each deck having a cover card and other cards having top and bottom surfaces and further where the cards other than the cover cards have means for selecting a dictionary page number corresponding to one letter selected from the group of letters imprinted on the cover card and corresponding to a page in the dictionary;

(c) a deck of bonus cards, including at least one bonus cover card, each of the bonus cards having questions imprinted on one surface in selected categories together with a page number corresponding to a page in the dictionary containing the answer to the question;

(d) a game board having provided thereon a track comprising a plurality of playing spaces, each of the playing spaces having information corresponding to the information shown on the cover cards for the question card decks randomly interspersed with playing spaces corresponding to the deck of bonus cards;

(e) a plurality of playing pieces for use by participants of the game; and

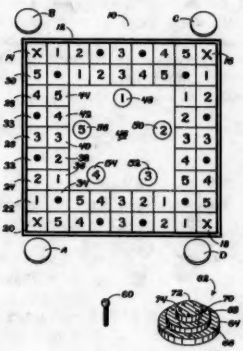
(f) means for determining the progress of the players along the track.

4,889,345

BOARD GAME

Randy A. Wawryk, 215 Amherst Street, Winnipeg, Manitoba R3J 1Y5, Canada

Filed Aug. 10, 1988, Ser. No. 230,360
Int. Cl.[4] A63F 3/00
U.S. Cl. 273—249 1 Claim



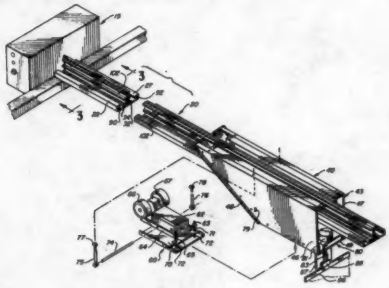
1. A board game, comprising:
a generally square game board;
an outer perimeter track formed by a series of adjacent squares around said game board;
an inner track formed by a series of adjacent squares within said outer perimeter track;
four corner squares of said outer perimeter track each designated by an "X" symbol;
two spaced squares on each of the four sides of said outer perimeter track designated by a dot;
remaining squares of said outer perimeter track designated by repeating sequential series of the numbers one through five;
four corner squares of said inner track designated by a dot;
remaining squares of said inner track designated by repeating sequential series of the numbers one through five;
a square central zone bordered by said inner track;
five circles sequentially numbered one through five spaced evenly around a central point of said central zone;
four different colored markers for movement around said game board;
five different groups of subject category question cards;
each of said question cards having a back face designated by a particular subject category and one number from one through five, and a front face bearing a name of a famous individual in said particular subject category and a clue to the individual's identity;
a pair of dice for randomly controlling movement of said markers around said game board;
four three tiered score markers, each having a color matching one of said game markers, each tier of said score markers having a plurality of spaced apertures; and
a plurality of pegs for insertion into said score marker apertures.

4,889,346

AUTOMATED TARGET RANGE SYSTEM

Donald M. Destry, Palatine, Ill., and Christopher M. Destry, Carmel, Ind., assignors to Computer Design Ranges, Inc., Palatine, Ill.

Filed Apr. 25, 1988, Ser. No. 185,969
Int. Cl.[4] F41J 7/02
U.S. Cl. 273—406 12 Claims



1. A target range system, comprising:
at least one longitudinally extending support track;
a carriage assembly movable along said support track and including a housing, carriage drive means and target positioning means; and
power conduit means located within said track for transmitting power from a power source at one end of said track to said drive means, said power conduit means having a first end connected in fixed position to said power source and a second end connected to and movable with said carriage assembly along said support track, said power conduit means maintaining proper position and operability within said support track.

4,889,347

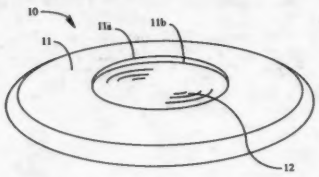
FLYING DISK WITH FLEXIBLE CENTER

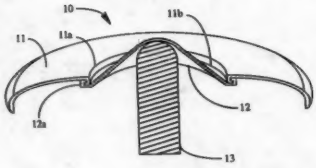
Michael V. Minear, 641 Canterbury Ave., Livermore, Calif. 94550

Filed Dec. 1, 1988, Ser. No. 278,568
Int. Cl.[4] A63H 27/00
U.S. Cl. 273—424 3 Claims

1. A flying disk comprising
a lifting body member containing a central aperture with a diameter of at least one fifth of the overall diameter of the flying disk to which is attached a stretchable device, wherein the device is of a generally circular shape and is formed from stretchable materials which will deform to create a conically concave depression of a depth equal to at least one sixth of the diameter of the said stretchable device in a direction generally perpendicular to the undeformed surface of the said stretchable device when acted on by a load no greater than a load equal to the weight of

the flying disk lifting body member and located generally about the center of the stretchable device;





means defining for removably fastening said body member and center stretchable devices together.

4,889,348

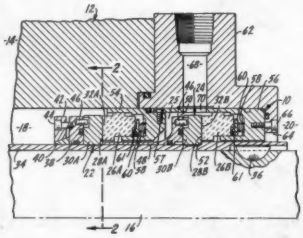
SPIRAL GROOVE SEAL SYSTEM FOR HIGH VAPOR-PRESSURE LIQUIDS

Donald E. Amundson, Prospect Heights; Jon B. Hamaker, Schaumburg; Glenn G. Peciat, Chicago, and Josef Sedy, Mount Prospect, all of Ill., assignors to John Crane-Houdaille, Inc., Morton Grove, Ill.

Filed Jun. 10, 1987, Ser. No. 60,215

Int. Cl.[4] F16J *15/34*

U.S. Cl. 277—1 **24 Claims**



15. A method of sealing a rotatable shaft extending through a housing against leakage of a high vapor-pressure liquid comprising the steps of

providing a first barrier to the flow one liquid along said shaft,

said first barrier having a first radially extending seal face with a plurality of pumping spiral grooves, said first seal face grooves having a first predetermined depth, allowing a portion of said fluid to escape across said barrier, and

providing a second barrier to the flow of fluid along said shaft, said second barrier having a second radially extending seal face with a plurality of pumping spiral grooves, said second seal face grooves having a second predetermined depth greater than said first predetermined depth.

19. A tandem spiral groove seal system for sealing a rotatable shaft extending through a housing against leakage of a fluid, the system comprising:

(a) a first upstream module including a primary ring sealingly affixed to the housing and a mating ring affixed to the shaft, the rings having opposed, radially extending faces, one of which has a plurality of pumping spiral grooves extending from one circumference of the face, said spiral grooves of said first module seal face having a first predetermined depth; and

(b) a second downstream module spaced apart from said first module, said second module including a primary ring sealingly affixed to the housing and a mating ring affixed to the shaft, the rings having opposed, radially extending faces, one of which has a plurality of pumping spiral grooves extending from one circumference of the face, said spiral grooves of said second module seal face having a second predetermined depth which is greater than said first predetermined depth of said first module seal spiral grooves.

4,889,349

SEALING ARRANGEMENT

Heinz K. Müller, Waiblingen, Fed. Rep. of Germany, assignor to Martin Merkel GmbH & Co KG, Hamburg, Fed. Rep. of Germany

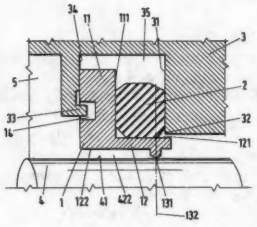
PCT No. PCT/EP87/00259, § 371 Date Jan. 14, 1988, § 102(e) Date Jan. 14, 1988, PCT Pub. No. WO87/06991, PCT Pub. Date Nov. 19, 1987

PCT Filed May 15, 1987, Ser. No. 155,721

Claims priority, application Fed. Rep. of Germany, May 16, 1986, 3616689

Int. Cl.[4] F16J *15/32*

U.S. Cl. 277—85 **22 Claims**



1. In a sealing arrangement including a sealing means, a first machine part (3) separating a space (5) of higher pressure from a space of lower pressure and forming, to receive the sealing means, an annular space (35) which is limited, on the low-pressure side, by an end face (31) of the first machine part for supporting the sealing means, and a second machine part (4, 8) which forms an opposing surface that is movable relative to the sealing means, the sealing means together with the opposing surface (41) enclosing an annular gap (422), the sealing means that comprises:

a sealing ring (1) made of flexible material, which has a thin walled tubular sealing-ring part (12), a sealing edge (131) projecting from the seal ring part toward the opposing surface, a supporting part (11), which supports the tubular sealing-ring part (12) on the side of higher pressure, and a tension ring (2) made of elastic material, which bears against the tubular sealing-ring part (12) and is subjected to the pressure of said space of higher pressure and which rests against the end face (31) of the annular space (35), wherein the supporting part (11) is connected to the tubular sealing-ring part (12) at a distance from the sealing edge (131) and interacts with the tension ring via a sealing ring end face (111) for transmitting thrust toward the tension ring upon pressurization of the higher pressure space, the space (5) of higher pressure being in communi-

cation both with the peripheral surface of the tension ring (2) opposite the second machine part and with the gap (422) between the tubular sealing-ring part (12) and the opposing surface (41).

4,889,350

BELLOWS SEAL ARRANGEMENT

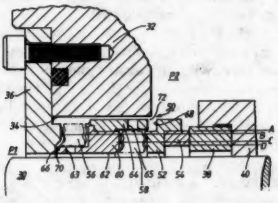
Brian R. Tranter, High Wycombe, England, assignor to EG&G Limited, High Wycomb, England

Filed Jun. 1, 1988, Ser. No. 200,914

Claims priority, application United Kingdom, Jun. 5, 1987, 8713171

Int. Cl.[4] F16J *15/34, 15/52*

U.S. Cl. 277—88 **11 Claims**



1. A bellows seal arrangement for a rotary seal comprising:

a member having a seal face;

a bellows assembly supporting a seal face insert in engagement with said seal face of said member to define an annular seal interface, said seal interface having an inner seal interface diameter and an outer seal interface diameter;

said bellows seal assembly including first and second bellows serially connected by a coupling member and arranged to be responsive to the same pressure external thereto and the same pressure internal thereto, said first bellows having a greater effective diameter than that of said second bellows;

said coupling member being movable as said bellows expand and contract and including first and second portions which during movement can bridge, respectively, the first and second bellows and render the bridged bellows inactive;

a first stop means engageable by the first portion of said coupling member to provide a bridge across said first bellows limiting compression of said first bellows, whereby said second bellows remains active to maintain the engagement of said seal face insert with the seal face of said member; and

a second stop means engageable by the second portion of said coupling member to provide a bridge across said second bellows limiting compression of said second bellows, whereby said first bellows remains active to maintain the engagement of said seal face insert with the seal face of said member.

4,889,351

HYDRAULIC SEAL

Stanley A. Frost, 4041 S.W. Tunnelwood, Portland, Oreg. 97221

Filed May 12, 1988, Ser. No. 193,508

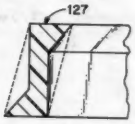
Int. Cl.[4] F16J *15/32*

U.S. Cl. 277—165 **25 Claims**

12. A seal for use in a hydraulic cylinder wherein one portion of the cylinder carries the seal and includes a groove having a base therein, the groove base having a first predetermined diameter and being bounded on either side by lands having a second predetermined diameter, and another portion of the cylinder which moves relative to the one portion, said seal comprising:

a static seal element constructed and arranged to fit in the groove; and

a resilient, substantially non-elastic dynamic seal element having a continuous annular form, said form being inscrib-



able in a truncated, annular, conical section, said conical section having a larger diameter base end and a smaller diameter top end, said dynamic seal element being constructed and arranged to be fitted in said groove and spaced from the groove base by said static seal element.

4,889,352

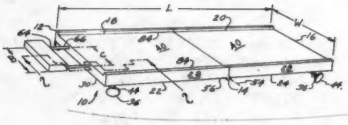
FOLDING MECHANIC'S CREEPER

Louis D. Chamberlin, Jr., and Mark D. Chamberlin, both of 34457 Fairview Dr., Yucaipa, Calif. 92399

Filed Sep. 6, 1988, Ser. No. 240,543

Int. Cl.[4] B62B *11/00*

U.S. Cl. 280—32.6 **13 Claims**



1. A mechanic's creeper comprising:

(a) first and second panel members, each comprising a panel portion having a supportive surface for a user of the creeper, and a peripheral flange portion extending therefrom;

(b) hinge means for connecting the panel members, the hinge means permitting the panel members to be moved between an open position wherein the panel members are substantially coplanar for supporting the user's body in a supine position above a horizontal floor surface and a closed position wherein the respective flange portions are in proximate edge contact, the panel members together forming a closed container;

(c) wheel means for rollingly supporting the panel members above the floor surface in the open position;

(d) a head support member for supporting the user's head;

(e) means for supportively connecting the head support member in horizontally spaced relation to the first panel member with the panel members in the open position, the head support member being located horizontally beyond the first panel member from the second panel member; and

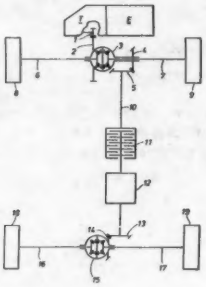
(f) means for storing the head support member within the container when the panel members are in the closed position.

4,889,353

DIRECTION-DEPENDENT POWER TRANSMISSION SYSTEM

Tetsuro Hamada; Kazuhiko Shimada; Katsuhiko Masuda, and Kazunori Shibuya, all of Saitama, Japan, assignors to Honda Giken Kogyo K.K., Japan

Filed Jan. 27, 1988, Ser. No. 148,804
Claims priority, application Japan, Jan. 28, 1987, 62-017732
Int. Cl.[4] B60K *17/34*; F16D *11/06*
U.S. Cl. 180—233 **9 Claims**



8. A power transmission system for a vehicle having at least a front wheel set and a rear wheel set which are driven by a common power source, comprising:

a one-way clutch means which transmits rotational power both ways between its input member and its output member in a low speed range and transmits rotational power only from the input member to the output member in a high speed range;

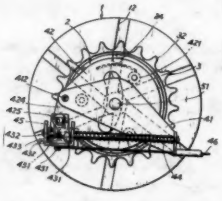
the one-way clutch means being connected in a path of power transmission between the power source and the rear wheel set.

4,889,354

ECCENTRICALLY OPERATING SPEED-VARIATING MEANS FOR BICYCLE

Maz Wen, P.O. Box 89-42, Taipei, Taiwan

Filed Dec. 21, 1987, Ser. No. 135,331
Int. Cl.[4] B62M *9/08*
U.S. Cl. 280—236 **7 Claims**



1. A speed variating means for bicycle comprising:

a driving disk secured to a hub or spokes of a bike wheel having a plurality of radial slots formed in said disk;

a sliding roller carrier means having a plurality of sliding blocks slidably formed in an annular groove of said carrier means, each sliding block having a sliding roller protruding inwardly to slidably engage each said radial slot in said driving disk and having a clutching means operatively coupling said sliding block with said carrier means;

a chain wheel secured with said carrier means and driven by a driving chain operated by a bike pedal for driving said carrier means; and

a variable speed adjusting means having an eccentric plate rotatably secured with said carrier means and eccentrically biased with respect to the axle by slidably moving the sliding rollers in said radial slots for adjusting a transmission radius between the driving chain and the axle for variating a bike speed;

said sliding roller carrier means including: a collar secured with the chain wheel having an outer annular groove, a plurality of sliding blocks slidably engaged with said outer annular groove each block having a sliding roller protruding inwardly to slidably engage each said radial slot in said driving disk, and an inner annular groove for rotatably engaging a plurality of coupling rollers formed on said eccentric plate of said variable speed adjusting means, said roller carrier means and said chain wheel being concentric to a center of said eccentric plate;

said sliding block being formed with a wedge portion tapered rearwardly or counter-clockwise if the chain wheel is driven clockwise to form a pair of rear acute-angle portions at a tapered end of the wedge portion and a pair of front obtuse-angle portions at an opposite end of the wedge portion proximate to the sliding roller secured on said sliding block;

the improvement which comprises:

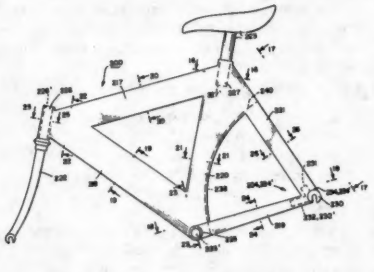
said clutching means including at least a pair of clutching rollers retained on a supporting frame movably held on said wedge portion, and a tensioning spring normally tensioning said clutching rollers rearwardly towards the acute-angle portions to release the clutching rollers from two side walls of the outer annular groove of the roller carrier means, or operatively depressed by an arcuate plate formed on an eccentric plate of said speed adjusting means to urge said clutching rollers frontwardly towards the obtuse-angle portions to frictionally couple said carrier means with said sliding block to forwardly drive said driving disk.

4,889,355

COMPOSITE BICYCLE FRAMES AND METHODS OF MAKING SAME

Brent J. Trimble, P.O. Box 246, Berryville, Ark. 72616

Continuation-in-part of Ser. No. 123,338, Nov. 20, 1987, which is a continuation-in-part of Ser. No. 53,320, May 12, 1987, Pat. No. 4,850,607, which is a continuation-in-part of Ser. No. 861,983, May 12, 1986, abandoned, which is a continuation of Ser. No. 149,984, Jan. 29, 1988. This application Jun. 16, 1988, Ser. No. 207,631
The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.
Int. Cl.[4] B62K *19/16*
U.S. Cl. 280—281.1 **72 Claims**



1. A bicycle frame comprising a generally hollow unitary frame component extending longitudinally between and connecting at least two of a steering support means for rotatably supporting a front fork assembly for carrying handle bars and

a front wheel assembly, a seat support means for supporting a seat assembly, a pedal support means for supporting a pedal assembly, and a rear wheel support means for supporting a rear wheel assembly;

said generally hollow unitary frame component comprising at least two adjacent wall sections each of which comprises at least one moided layer of fibrous material impregnated with a synthetic resin, said adjacent wall sections being integrally united by at least one integrally uniting juncture comprising a pair of overlapping edges of said adjacent wall sections, said overlapping edges being integrally united together to provide sufficiently intimate contact between the fibrous material of one of said overlapping edges and the fibrous material of the other of said overlapping edges for stress loadings to be transferred from fiber to fiber across said juncture, and said juncture thereby providing a substantially continuous wall of said resin impregnated fibrous material around an interior cavity of said generally hollow unitary frame component.

4,889,356

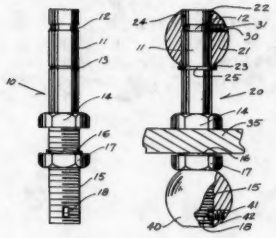
TRAILER HITCH BALL ASSEMBLY

Francis E. Morris, 1706 Cherry St., Wausau, Wis. 54401

Filed Jan. 12, 1989, Ser. No. 296,013

Int. Cl.[4] B60D *1/06*

U.S. Cl. 280—416.1 **9 Claims**



1. A trailer hitch ball assembly adapted to be attached to a vehicle drawbar for towing a trailer, said assembly comprising:

a. cylindrical post means having an *a top end and* a smooth upper portion for receiving and supporting a substantially spherical ball and a threaded lower portion;

b. said smooth upper portion having a circumferential retainer groove formed therein;

c. a substantially spherical ball having a central bore formed therein for engaging said upper portion;

d. retainer means in said ball for selectively engaging said retainer groove to retain said ball on said upper portion while permitting rotation of said ball on said upper portion;

e. nut means for securing said threaded portion of said post on said vehicle drawbar;

f. said post means including a second circumferential groove formed in said upper portion and spaced beneath said retainer groove; and,

g. snap ring means for engaging said second groove for supporting said ball when in place on said post.

4,889,357

PARKING STAND FOR SUPPORTING THE TONGUE OF A PARKED TRAILER

John C. Perry, 3170 Falcon Dr., Carlsbad, Calif. 92008

Filed May 31, 1988, Ser. No. 200,603

Int. Cl.[4] B60S *9/08, 13/00*

U.S. Cl. 280—475 **38 Claims**

1. A parking stand for supporting the tongue of a parked trailer, wherein the tongue mounts a front coupling part containing a coupling ball-receiving coupling socket having a normally lower open side bounded by an edge of the coupling part, and means for clamping a coupling ball in the socket, said stand comprising:

an elongate support means having normally upper and lower ends,

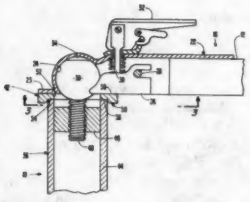
a coupling ball means at the upper end of said support means to be clamped within said coupling socket of the trailer tongue coupling part,

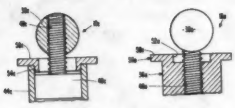
a shank coaxially joining said coupling ball means and the upper end of said support means,

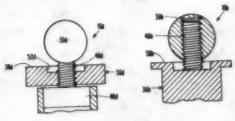
means providing a clamp surface about and in a transverse plane of said shank,

ground engaging means on the lower end of said support means, and wherein

(a) said parking stand is adapted to be placed in a generally upright trailer tongue supporting position below the tongue of a parked trailer wherein said coupling ball







means is uppermost and clamped within the coupling socket of the trailer coupling part, said clamp surface is located below and faces upwardly toward said edge of the trailer coupling part, and said ground engaging means engages the ground to support trailer tongue in an elevated position above the ground,

(b) said coupling ball means and said clamp surface are relatively movable toward and away from one another longitudinally of said shank, and

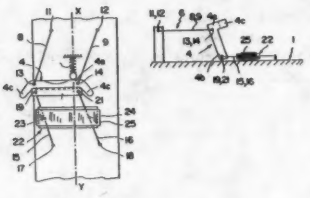
(c) said parking stand includes means for effecting relative movement of said coupling ball means and said clamp surface toward one another longitudinally of said shank to engage said clamp surface firmly against said edge of the trailer coupling part when said parking stand occupies said trailer tongue supporting position, thereby to secure said parking stand against lateral swivel movement relative to the trailer tongue.

4,889,358

FRONT BINDING FOR A SKI BOOT

Pierre Rullier, Annecy, France, assignor to Salomon S.A., Metz-Tessy, France

Filed Sep. 14, 1988, Ser. No. 244,085
Claims priority, application France, Sep. 18, 1987, 8712953
Int. Cl.[4] A63C 9/08
U.S. Cl. 280—628 49 Claims



16. A front abutment for binding a ski boot on a ski comprising:

means for support adapted to be affixed to a ski;

retention jaw means for retaining the front of a ski boot, said retention jaw means having a dimension extending substantially transverse to a ski, and said retention jaw means being moveably attached to said means for support;

elastic means for maintaining said retention jaw means in a central, engaged position; and

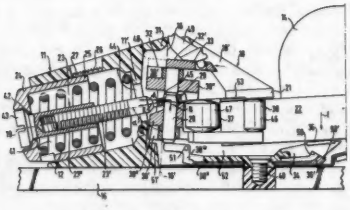
movement control means for controlling movement of said retention jaw means between said central, engaged position and a lateral, released position, said movement control means permitting said retention jaw means to have a lateral movement wherein said dimension extends substantially transverse to a ski in all lateral, released positions while displacing an upper portion of said retention jaw means in a frontward direction and a lower portion of said retention jaw means in a rearward direction, whereby there is a progressive upward opening of said retention jaw means during movement of said retention jaw means in the lateral direction.

4,889,359

LATERALLY RELEASABLE JAW UNIT OF A SAFETY SKI BINDING

Ulrich Kowatsch, Leonberg, and Heike Bauer, Welzheim, both of Fed. Rep. of Germany, assignors to GEZE Sport International GmbH, Fed. Rep. of Germany

Filed Jun. 14, 1988, Ser. No. 206,590
Claims priority, application Fed. Rep. of Germany, Jun. 19, 1987, 3720440
Int. Cl.[4] A63C 9/085
U.S. Cl. 280—629 22 Claims



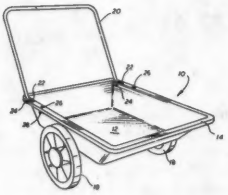
1. A laterally releasable jaw unit, such as a toe unit of a safety ski binding for holding one end of a ski boot to a ski surface, the binding also having a jaw which holds the other end of the ski boot, said jaw unit comprising: a binding housing, a sole clamp having two lateral limbs and a hold-down clamp disposed on the housing adjacent the ski boot, and a release spring disposed in the binding housing substantially in longitudinal direction of the ski; said release spring having a first end acting on the binding housing and a second end exerting a force on the sole clamp, the force having a substantial component in the longitudinal direction of the ski away from the ski boot; tilting surfaces being arranged at a side of the binding housing facing the ski boot on both sides of a vertical central longitudinal plane, said tilting surfaces having mutually parallel, straight tilting axes standing substantially upright from the ski surface, and complementary tilting counter-surfaces on the side of the sole clamp facing away from the ski boot and acting on the tilting surfaces under the action of a release force in such a way that with excessive lateral forces on the ski boot the sole clamp pivots outwardly against the force of the release spring and releases the ski boot, said release spring exerting a slightly downwardly directed force on the sole clamp, an angle being present between the line of action of the release spring and branches of the tilt axes lying beneath the line of action, the angle being smaller than 90° by an amount such that a force component thereof which acts downwardly on the sole clamp is sufficient to press the sole clamp downwardly along the tilting axes until the hold-down clamp presses against an upper side of a sole of the ski boot at least during vibrations which occur during skiing.

4,889,360

UTILITY CARD WITH FOLDABLE HANDLE

Paul M. Havlovitz, Escondido, Calif., assignor to Republic Tool & Manufacturing Corp., Carlsbad, Calif.

Filed Nov. 18, 1988, Ser. No. 272,904
Int. Cl.[4] B62B 1/04
U.S. Cl. 280—655.1 4 Claims



1. A utility cart comprising a load bearing surface, wheel means secured to said load bearing surface, said load bearing surface having respective lipped portions on opposed sidewalls thereof, said lipped portions having slot means therein, a generally U-shaped handle means having free ends extending through said slot means, said free ends extending along the underside of said respective lipped portions, means on said opposed sidewalls for pivoting said handle means, and removable fastening means for securing said free ends of said handle means to the underside of said respective lipped portions, whereby said handle means is free to rotate about said pivot means to a folded inoperable position when said fastening means are removed from said free ends of said handle means.

4,889,361

COMPOSITE TRACTOR/TRAILER BEAM SPRING SUSPENSION SYSTEM

Benjamin V. Booher, Leucadia, Calif., assignor to Suspension Group, Ltd., Encinitas, Calif.

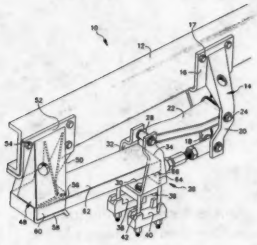
Filed Sep. 26, 1988, Ser. No. 248,597
Int. Cl.[4] B60G 11/02
U.S. Cl. 280—718 15 Claims

1. A suspension system for supporting the body of a heavy-duty vehicle on an axle and wheel assembly, comprising:

a first suspension hanger for attachment to a longitudinally extending vehicle frame;

a second suspension hanger for attachment to said vehicle frame at a position spaced longitudinally from said first hanger;

an elongated unitary composite beam spring member secured in canterlevered fashion to one of said first and said



second hangers and extending toward the other of said first and second hangers;

a cam on said one of said hangers for progressive engagement with said beam spring member as it deflects under load; and

an axle attachment bracket operatively connected to said composite beam spring member between said first and said second hangers for supporting an axle therewith.

4,889,362

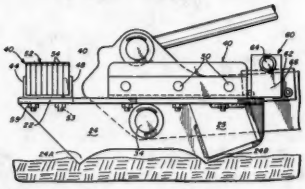
STABILIZER PAD FOR EARTHMOVING APPARATUS

Andry Lagsdin, 54 King Hill Rd., Hanover, Mass. 02339

Filed Apr. 20, 1988, Ser. No. 183,844

Int. Cl.[4] B60S *9/02*

U.S. Cl. 280—763.1 **4 Claims**



1. For an earth moving apparatus having at least one support arm, a stabilizer comprising a plate-like piece having alternate surfaces one of which is resilient and the other of which includes a flanged web, means pivotably supporting said piece on end of said arm, said piece being rotatable relative to said support means between alternate positions wherein either said resilient surface is facing downwardly or said flanged web is engaging the ground, and latch means including a freely rotatable latch member adapted to operate under gravitational force to engage and lock said piece in a predetermined position when the support arm is down and to disengage from said piece when the support arm is lifted so as to enable manual pad reversal.

4,889,363

SILENT, RATTLE-FREE PASSIVE SEAT BELT SYSTEM

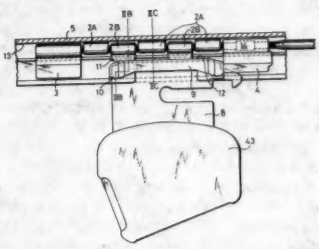
Kazuo Yamamoto, Sagamihara, and Katsuyasu Ono, Yokohama, both of Japan, assignors to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 30, 1988, Ser. No. 278,012

Claims priority, application Japan, Dec. 2, 1987, 62-184072; Dec. 28, 1987, 62-332927

Int. Cl.[4] B60R *21/00*

U.S. Cl. 280—804 **13 Claims**



1. A passive seat belt system comprising:

a guide rail;

a slider movable along the guide rail;

a webbing fastened to the slider, which can provide selectively both an occupant restraining state and a occupant non-restraining state;

a drive member for driving the slider, said drive member being made of a material flexible in directions perpendicular to the length thereof;

means for connecting the drive member and slider in constant contact with each other while maintaining a gap between the drive member and the guide rail at the position of said means for connecting and on a side opposite to the slider; and

contact members provided on the drive member at predetermined longitudinal intervals with the connecting means interposed therebetween, said contact members being in constant contact with the guide rail on a side opposite to the slider.

4,889,364

SKI-CARRYING ELEMENT

Andre Glaunes, Moutas, 47350 Escassefort, France

Filed May 4, 1988, Ser. No. 188,327

Int. Cl.[4] A63C *11/02*

U.S. Cl. 280—814 **6 Claims**

1. A ski-carrying element permitting substantially horizontal transportation of a ski by hand in a balanced fashion, said ski-carrying element comprising:

a fixed part including an abutment means and a plate mounted on a sole piece of the ski, said plate being mounted on said ski without extending therebeyond, said plate carrying said abutment means;

means for binding said ski-carrying equipment to said sole

piece of the ski on a face of the ski which faces a bottom of a ski boot;

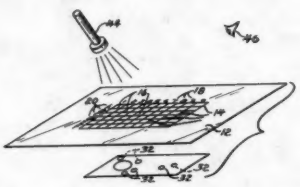
a moving part for gripping said ski-carrying element, said moving part being movable between an unfolded position, in which said moving part extends beyond one of the sides of the ski, and a retracted position in which said moving part is located between the sides of said ski, the moving part being mounted to pivot about an axis of rotation perpendicular to the sole piece of the ski, said moving part abutting against said abutment means of said fixed part in said unfolded position, said moving part including a binding element for binding to the fixed part, said binding element including a means for pivoting, sliding said moving part relative to said fixed part, said moving part including an operating handle for extending said binding element, said binding element of said moving part being slidably mounted on said plate in a direction perpendicular to a mid-line of the sole piece of the ski, on one side of said mid-line, between a position corresponding to the retracted position, where the binding element is prevented from rotation, and the unfolded position in which the binding element is then able only to pivot about the axis of rotation located in a corresponding terminal area of the binding element, the handle being connected to the binding element on a side opposite to the terminal area in which said pivoting occurs, wherein a greater weight of a part of the ski being located behind said ski-carrying element relative to said axis.

4,889,365

COUNTERFEIT RESISTANT LABEL AND METHOD OF MAKING THE SAME

Gerald A. Chouinard, Elburn, Ill., assignor to The Label Printers, Aurora, Ill.

Filed Apr. 11, 1988, Ser. No. 179,885
Int. Cl.[4] B42D *15/00*; G09F *3/00*; B32B *3/22*; G06K *19/06*
U.S. Cl. 283—70 **12 Claims**



1. A label system for impeding counterfeiting comprising:

a substrate defining a label base having one side for attachment to a product or packaging therefore and an opposite product identification side;

visible indicia on said product identification side for providing product identification to a viewer of said product identification side;

additional indicia of a first color printed on said product identification side with an ink that will be visible when illuminated with light of a frequency outside of the visible spectrum, said additional indicia being in the form of several discrete marks at less than all of a plurality of predetermined locations on said opposite side to define a selected code word from a family of code words, each code word designating at least one different bit of information;

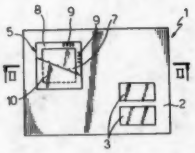
a mask means on said product identification side masking the presence of said discrete marks except when illuminated with said light of a frequency outside the visible spectrum.

4,889,366

SECURITY DOCUMENT

Bruno Fabbiani, Via Feletto, 17, 10155 Torino, Italy

Filed Jun. 29, 1987, Ser. No. 67,934
Claims priority, application Italy, Jul. 1, 1986, 67532 A/86
Int. Cl.[4] B42D *15/00*
U.S. Cl. 283—86 **25 Claims**



1. A security document comprising a support, at least one identification code, at least one hologram secured to said support, one or more protective coatings (**10**) applied at least on the surface of said hologram (**5**) having an edge (**8**), and optically readable reference marking means (**9, 20, 21, 22**) on said holograph visible to an external source (**5**) for allowing the positioning of the hologram in a reading device.

4,889,367

MULTI-READABLE INFORMATION SYSTEM

L. Michael Miller, Dallas, Tex., assignor to Frito-Lay, Inc., Dallas, Tex.

Filed Oct. 7, 1988, Ser. No. 254,845
Int. Cl.[4] B42D *15/00*; G09C *5/00*; G06K *1/00, 7/10*
U.S. Cl. 283—88 **9 Claims**

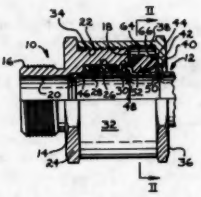
1. A multi-readable information system, comprising a substrate on which there is printed information in the form of human-readable symbology, and printed information in the form of machine-readable symbology, wherein the machine readable symbology differs from the human-readable symbology, the human-readable symbology occupies at least a portion of an area that is also occupied by the machine-readable symbology without either symbology interfering with the readability of the other, the machine-readable symbology is printed in a first ink that can be read utilizing energy of a first wavelength, the human-readable symbology is printed in a second ink that differs from the said first ink and can be read in a humanly visible wavelength that differs from said first wavelength, which second ink does not absorb sufficient energy in said first wavelength to prevent reading of the machine readable symbology by a compatible machine, and wherein the substrate material reflects both said first wavelength and said humanly visible wavelength.

4,889,368

COMBINATION QUICK-CONNECT AND THREAD-DISCONNECT TUBE CONNECTOR

Robert A. Laipply, Jackson, Mich., assignor to Aeroquip Corporation, Jackson, Mich.

Filed Dec. 12, 1988, Ser. No. 282,697
Int. Cl.[4] F16L *17/02*
U.S. Cl. 285—18 **6 Claims**



1. A push-to-connect coupling characterized by its control of the coupling parts during uncoupling comprising, in combination, an annular female part having a connection end, an open end and an axial passage interconnecting said ends and a coupler selectively axially positionable thereon having an abutment axially spaced from and in opposed relation to said open end, an annular male part having an axial passage, a nose and an exterior outwardly radially extending first shoulder axially spaced from said nose, said nose being axially insertable into said female part passage through said coupler and said open end, and a radially expandable and contractible axially displaceable retainer located intermediate said female part open end and said coupler abutment axially receiving and radially expanding over said male part nose and shoulder and contracting into abutting engagement with said shoulder, said retainer being operatively interposed between said shoulder and said abutment whereby said coupler maintains said male and female parts coupled and controls the relative axial position of said parts during separation, said retainer comprising an annular radially expandable and contractible ring formed of a semi-rigid synthetic plastic material, said coupler comprising a nut threaded upon said female part adjacent said open end concentric to said female part passage having a radially extending flange defining said abutment in axially spaced relationship to said open end, said flange including a counterbore recess having an inner surface facing said open end and a central opening concentric to said female part passage through which said male part nose and first shoulder are inserted during coupling, said counterbore recess being outwardly radially defined by an axially extending inwardly facing ledge substantially parallel to said female part passage, said ring including a periphery, and a portion of said ring periphery engaging said ledge when said ring is contracted preventing radial expansion of said ring.

4,889,369

ADAPTER FITTING

David E. Albrecht, 1383 Granary Rd., Blue Bell, Pa. 19422

Filed Sep. 16, 1985, Ser. No. 776,497
Int. Cl.[4] F16C *23/00*
U.S. Cl. 285—39 **6 Claims**

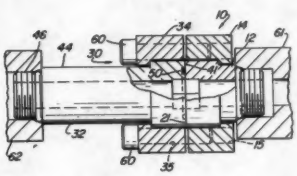
1. An adapter fitting for connecting a threaded flow connection and face sealing flanged flow connection comprising:

a flange member having a plurality of bolt holes arranged in a pattern and a bore located within said bolt hole pattern, said flange member having a pair of spaced apart surfaces, said bore extending through said flange member between said surfaces thereof,

and a mounting member mounted in said bore of said flange member and including

a first body portion held in said flange member bore and providing a face for mating with a flanged flow connection,

a second body portion extending beyond one of said surfaces of said flange member to a location spaced therefrom, said extended end of said second body portion having threads formed thereon for engagement with a threaded flow connection,



a fluid flow passage extending through said body portions, and

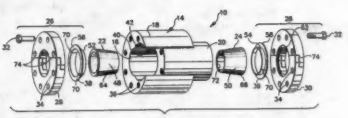
a wrenching surface formed internally in the end of said first body portion of said mounting member extending inwardly from said mating face and adapted to be engaged by a wrenching mechanism for causing rotation of said mounting member.

4,889,370

PIPE REPAIR ASSEMBLY

Douglas B. Firestone, 9182 Tonya La., Santee, Calif. 92071

Filed May 31, 1988, Ser. No. 200,533
Int. Cl.[4] F16C *21/06*
U.S. Cl. 285—342 **9 Claims**



1. A pipe repair assembly, comprising:

an elongate hub member having a through bore size to fit over a pipe and a substantially smooth outer cylindrical periphery;

the hub member being formed in two separate, mating portions, a first one of the portions having a longitudinal slot for fitting the portion transversely over a pipe, and a pair of part-cylindrical, co-axial cut-outs extending from its inner to its outer surface, one on each side of the slot, and the second portion having a crescent-shaped cross-section for longitudinal sliding engagement with said first portion, the outer surface of the crescent shape comprising means for slidable mating engagement with said part-cylindrical cut-outs to cover the slot so that the hub member surrounds the pipe, the inner surface of the crescent shape comprising a part-cylindrical section of diameter corresponding to that of the inner surface of the first portion to form a continuous cylindrical bore surrounding the pipe;

at least one sealing sleeve for fitting into the gap between the hub member through bore and the pipe, the sleeve having a slit for allowing it to be fitted over the pipe; and

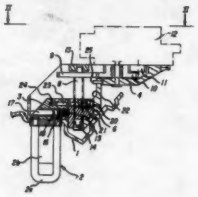
locking means for urging the sealing sleeve into the hub member through bore and into sealing engagement with the pipe.

4,889,371

MOTORIZED CLOSING DEVICE, PARTICULARLY FOR AN AUTOMOTIVE-VEHICLE TRUNK

Joel Girard, Abbeville, and Christian Wattebled, Sailly-Flibracourt, both of France, assignors to Vachette, Paris, France

Filed Nov. 13, 1987, Ser. No. 119,884
Claims priority, application France, Nov. 13, 1986, 86 15726
Int. Cl.[4] E05C 17/56
U.S. Cl. 292—201 19 Claims



1. A closing device, comprising:

a movable element and a fixed element which can be interlocked by said closing device, wherein said movable and fixed elements are disengageable;

a latch and a striker, cooperating with each other, joined to said movable and fixed elements for ensuring interlocking of said movable and fixed elements;

at least one motor means associated with at least one of said latch and said striker for ensuring at least one of interlocking and disengagement of said movable and fixed elements;

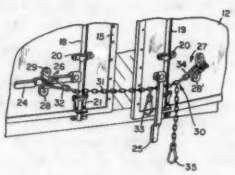
a disengaging means for disconnecting at least one of said associated latch and striker from said motor means during an approach stage of said closing device, wherein said disengaging means is triggered when resistance force applied to at least one of said associated latch and striker is greater than a preset level so as to maintain interlocking of said movable and fixed elements, and wherein during a final closing stage of said closing device, said disengaging means is inhibited.

4,889,372

SWING LIMIT APPARATUS FOR CARGO BOX DOORS

Howard C. Dege, and Paul R. Gilmore, both of Seaford, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 13, 1988, Ser. No. 193,844
Int. Cl.[4] E05C 7/08
U.S. Cl. 292—218 7 Claims



1. In combination with a cargo box having an opening and a pair of doors for closing said opening, said doors being pivotally attached to said cargo box to open by swinging outwardly from said cargo box and meeting centrally of said opening when said doors are closed, said doors each having a latch mechanism for securing said doors when closed including a handle connected to a rotatable latch-actuating bar in which the handle is moved to a position adjacent said door to engage said latch mechanism to secure said door, said mechanism having a handle keeper including a lower bracket fixedly attached to said door and an upper bracket pivotally attached to said door, said brackets together operating to selectively maintain said handle adjacent to said door, apparatus for limiting the swing of a one of said doors upon opening comprising:

a flexible elongate member;

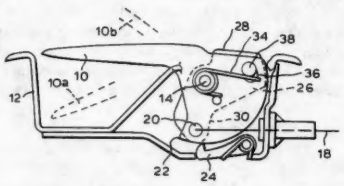
attachment means connected to said flexible elongate member for attaching to said lower keeper bracket of each door with at least a portion of said flexible member extending between said doors when closed, said attachment means providing at least first, second, and third attachment points spaced-apart along said flexible member and each of said attachment points being capable of attachment to either of said lower keeper brackets so that said apparatus is attachable to lower keeper brackets of cargo boxes with different spacings to limit the swing of one of said doors upon opening, wherein said each of said lower keeper brackets includes a bore therethrough and said attachment means comprises hooks attached to said flexible member for being received in said bores in said lower keeper brackets.

4,889,373

DOOR HANDLE UNIT

Marcus J. S. Ward, Billericay, and Peter J. Seymour, Hullbridge, both of United Kingdom, assignors to Ford Motor Company, Dearborn, Mich.

Filed Nov. 13, 1987, Ser. No. 120,058
Claims priority, application United Kingdom, Nov. 14, 1986, 8627245; Dec. 23, 1986, 8630707
Int. Cl.[4] E05B 3/00
U.S. Cl. 292—336.3 10 Claims



1. A door handle unit for a vehicle door lock system, the unit comprising a housing adapted to be flush-mounted in a door trim panel, a handle assembly pivotally mounted in the housing and means for connecting one end of a door lock operating cable to the handle assembly, the handle assembly comprising a handle and a release member both mounted on a common pivot axis in the housing and a detent member arranged to capture the handle when a locked condition of the handle is set and to prevent the handle being moved to an unlocked condition, and means for operating the release member to move the detent and to release the handle, and wherein the handle is spring-loaded for movement on the pivot axis so that, when the detent is moved, the handle is spring-biased to its unlocked position.

4,889,374

TWO-STAGE AUTOMOBILE BUMPER

Sain-Lu Choun, 208, Lin Yun II Village, Leou Shin Village, Shoei Shanq Shiang, Chia Yi Hsien, Taiwan

Filed Jun. 16, 1988, Ser. No. 207,205
Int. Cl.[4] B60R 19/26, 19/28, 19/02; F16F 7/00
U.S. Cl. 293—132 4 Claims

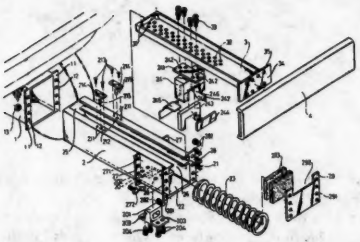
1. A two-stage automobile bumper assembly for an automobile having a chassis comprising:

two outer supporting frames respectively welded at right and left sides of a front of the chassis, each said outer

supporting frame containing an inner supporting frame and being provided with a flange at a front end which said flange is bored with round holes for assembling each said outer supporting frame with the associated said inner supporting frame;

each said inner supporting frame contained in the respective said outer supporting frame being provided with (a) an upper guide way, (b) a lower guide way, (c) a buffer received in said upper guide way, (d) a coiled spring received in said lower guide way, (e) a slide block also received in said lower guide way and being attached at a bottom of the buffer such that said slide block can move along the lower guide way, (f) a rectangular hole bored vertically through a bottom of said inner supporting frame into said lower guide way, and (g) a stop block inserted in and extending through said rectangular hole and thus extending in said lower guide way;

each said buffer contained in a respective said upper guide way of the respective inner supporting frame being attached together with the respective said inner supporting frame by means including two pins and positioning holes in said buffer for screws to pass therethrough in further attaching the slide block to said buffer, said slide block being provided with (a) a limit plate, (b) a reverse L-shaped plate by which said limit plate is constrained, and (c) a faceplate provided at a front end of said buffer for attaching said buffer with a bumper by means of screws and holes; and



such that when the bumper receives a shock, the pins keeping the buffers steady with the respective inner supporting frames are cut into two pieces so that the buffers are pushed backward to compress the respective coiled springs, and then the springs automatically extend back pushing the buffers forward, respective said slide blocks then surpassing the respective said stop blocks whereby respective said reverse L-shaped plates fall down so that the respective limit plates fall down to block the respective buffers from going backward once again without restraint.

4,889,375

FIREPLACE TOOL

James M. Leu, 159 Thornhurst, Bolingbrook, Ill. 60439

Filed Sep. 19, 1988, Ser. No. 245,576
Int. Cl.[4] A47J *49/00*
U.S. Cl. 294—10 **9 Claims**

1. A fireplace tool, comprising:

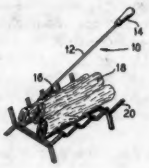
an elongated rod member having a handle end and a pointed poker end;

a grip member received on said handle end; and

a plurality of chisel members received in openings near said poker end,

said chisel members being secured within said openings and having body portions protruding through said elongated rod member, each of said chisel members including a plurality of planar faces formed thereon along the length of the body portion,

said faces intersecting to form edges extending along an axial length of the body portion, said body portion terminating in a point; and



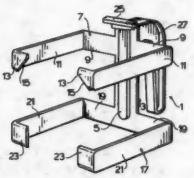
a plurality of teeth formed in each edge of each body portion of each chisel member, each tooth comprising a portion cut-out from said edge.

4,889,376

BOX HOLDER WITH HANDLE

Thomas Nagy, 128A McCaul Street, Toronto, Ontario, Canada M5T 1W1

Filed Dec. 20, 1988, Ser. No. 286,705
Int. Cl.[4] B65D *23/10*
U.S. Cl. 294—33 **3 Claims**



1. A holder for a rectangular carton of the type having a triangulated top with a forward pour spout and a rearward recess in the top opposing the pour spout, said holder comprising an upper and a lower set of arms, a supporting spine for said upper and lower set of arms, a tongue projecting forwardly from said spine above said upper set of arms and a rearward handle on said spine, said upper and lower sets of arms comprising opposing arm members spreadable from one another and said upper and lower sets of arms being separated from and spreadable independently of one another, each of the arms in said sets of arms comprising a rear arm section, a forwardly extending arm section at right angles to said rear arm section, and a short forward arm section at right angles to said forwardly extending arm section, the short forward arm sections in each of the arms in both of said sets being separated from one another and the short forward arm sections in said upper set of arms having a downwardly outwardly bevelled straight edge providing cam means for riding along the carton and spreading said upper set of arms to place said tongue in the rearward recess in the top of the carton with said lower arm set already wrapped tightly around the carton.

4,889,377

VEHICLE STORAGE SYSTEM

Roger Hughes, 1335 Bennett Dr., Unit #143, Longwood, Fla. 32750

Filed Aug. 14, 1987, Ser. No. 85,138
Int. Cl.[4] B60R *11/06*
U.S. Cl. 296—3 **10 Claims**

1. A storage system comprising in combination:

a vehicle body;

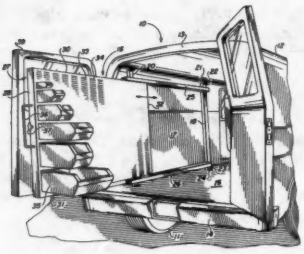
a vertical extending framework attached to said vehicle body and including a plurality of vertical frame members;

at least two channels horizontally supported on said frame-

work, said horizontally supported channels including an upper channel and a lower channel and said upper channel having a guide member on one end portion thereof;

a sliding carriage slidably mounted to said channels and supported thereby and adapted to slide therein from a first position in said vehicle to a second position extending from said vehicle, said sliding carriage having a panel attached thereto and said sliding carriage having an upper frame member, a lower frame member and a plurality of vertical frame members, said sliding carriage further including:

(a) a guide member and two roller bearing members



mounted adjacent the guide member on one end portion of the upper frame member;

(b) a guide member and two roller bearing members adjacent the guide member on one end portion of the lower frame member; and

(c) means for pivotably supporting the guide members and roller bearing members at the respective end portions of the upper and lower frame members;

a plurality of removable storage members for attaching to said sliding carriage panel; and

attaching means formed on said sliding carriage panel for removably attaching said plurality of storage members to said panel.

4,889,378

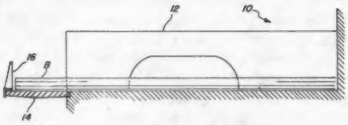
PICKUP TRUCK TAILGATE ACCESSORY

Ernest E. Sims, 1002 Edgewood St., Bryan, Tex. 77802

Filed Jul. 5, 1988, Ser. No. 215,028

Int. Cl.[4] B62D *25/00*

U.S. Cl. 296—57.1 **6 Claims**



1. An accessory for attachment to the tailgate of a pickup truck comprising a panel member of about the same width as the tailgate, and of a height at least about half that of the tailgate, a pair of hinge brackets secured to the rear end portion of the tailgate near the sides thereof, bracket means secured to said panel member and including a hinge pin secured to said bracket means and extending into an aperture in said hinge bracket, a pair of latch apertures in said hinge bracket, a latch bracket secured to said bracket means, and a latch pin laterally movable in said latch bracket between a latching position wherein said latch pin extends into one of said latch apertures and a release position wherein said latch pin is retracted from said latch aperture, whereby in said release position, said panel member may pivot about said hinge pins between a first position parallel to said tailgate and a second position substantially perpendicular to said tailgate.

4,889,379

ARRANGEMENT FOR SUPPORTING AND ADJUSTING SEATS IN VEHICLES

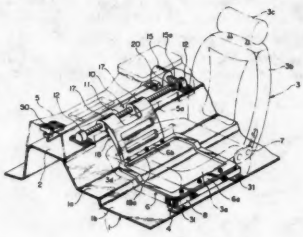
Selichi Aso, Higashihiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Jan. 29, 1988, Ser. No. 150,149

Claims priority, application Japan, Feb. 6, 1987, 62-26942

Int. Cl.[4] B60N *1/08*

U.S. Cl. 296—65.1 **19 Claims**



1. An arrangement for supporting and adjusting a seat in a vehicle, the arrangement comprising:

a part of a floor panel of a vehicle body including a portion thereof forming a floor tunnel which extends in a direction of the length of the vehicle body,

a sliding support member mounted on said part of the floor panel for supporting and sliding the seat, said sliding support member being placed between the floor tunnel and a side sill connected to a side portion of the floor panel on the side of the outside of the vehicle body and movable in the direction of the floor tunnel together with the seat provided on said sliding support member; and

a seat driving mechanism for adjusting a position of the seat in the direction of the length of a vehicle body, said seat driving mechanism including a motor disposed on a top portion of the floor tunnel, rotatable member disposed on a top portion of the floor tunnel and driven by said motor, and a connecting member engaged at a first edge portion thereof with said rotatable member and engaged at a second edge portion thereof with said sliding support member so as to be driven by said rotatable member for moving sid sliding support member along the floor tunnel.

4,889,380

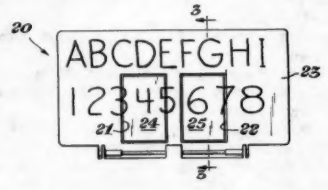
SCREEN PRINTED CLAMP-ON AUTOMOTIVE SUN-FILTER ASSEMBLY

Albert Pillifant, Jr., 1406 E. Pine St., Midland, Mich. 48640

Filed Sep. 26, 1988, Ser. No. 191,700

Int. Cl.[4] B60J *3/02*

U.S. Cl. 296—97.6 **5 Claims**



1. In a clamp-on automotive sun-filter assembly comprising

a see-through light-filtering panel and a molded plastic clamping panel, the panels having substantially aligned edges and a hinge connecting such edges, the clamping panel having first and second opposed faces, at least one cantilevered spring-clamp integrally molded at one end thereof with the clamping panel and extending laterally from the first face of the clamping panel, the clamping panel having for each said at least one spring-clamp a die clearance aperture formed therethrough from the first face to the second face of the clamping panel juxtaposed each said at least one spring-clamp to facilitate integrally molding the spring-clamp with the clamping panel, the second face of the clamping panel being substantially smooth and planar so that indicia can be screen printed thereon, the clamping panel being adapted to be clamped to an automotive sun-visor by means of said at least one spring clamp in combination with the clamping panel and the see-through, light-filtering panel being pivotable about the hinge to be swung below the sun-visor when the sun is low in the sky to better allow an automobile front seat occupant to see when the automobile faces toward the sun and to present the screen printed indicia to the view of the occupant, wherein the improvement comprises:

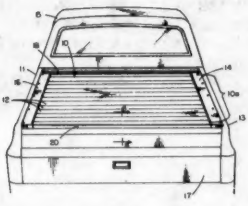
a substantially planar insert positioned in each die clearance aperture closely fitting the perimeter shape thereof, having the perimeter dimensions of the aperture, the perimeter of each die clearance aperture being formed with inwardly extending ledge portions substantially parallel to and spaced apart from the printable said second face so as to support a said insert in the aperture with the surface of the insert coplanar with the second face, and means engaging said first face for retaining the insert in each such die clearance aperture, each insert having as the coplanar surface a smooth substantially flat face and each insert together with the second face therearound providing a substantially uninterrupted surface for ready screen printing of indicia thereon.

4,889,381

RETRACTABLE TRUCK BED COVER APPARATUS

Charles C. Tamblyn, Kirkland, and Philip L. Forde, Bellevue, both of Wash., assignors to American & Overseas Corporation, Bainbridge Island, Wash.

Filed Mar. 25, 1988, Ser. No. 173,360
Int. Cl.[4] B60D *7/04*
U.S. Cl. 296—98 **15 Claims**



1. An apparatus for retracting a longitudinally flexible cover for a truck bed or the like, comprising:

two opposing end pieces positionable on opposite sides of the truck bed near one end thereof, said two end pieces having facing surfaces;

means supporting said two end pieces in position relative to each other;

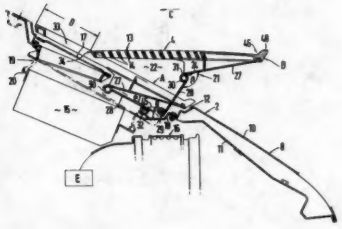
a relatively shallow track located on the facing surfaces of said end pieces, for receiving wheel-like elements extending from opposing end edges of a truck bed cover, said track being in the form of a spiral which closes gradually inwardly such that the cover rolls up upon itself as the wheel-like elements thereof move along said track, wherein said track has a width which is slightly greater than the vertical dimension of the wheel-like elements received therein and slightly deeper than the horizontal dimension of the wheel-like elements, the width of the track being substantially uniform for its entire depth at any point along the track, and wherein adjacent turns of the spiral are separated by a wall which has a substantially uniform thickness from top to bottom thereof and which is quite narrow relative to the width of said track.

4,889,382

VEHICLE SPOILER ARRANGEMENT

Hermann Burst, Rutesheim; Jürgen Durm, Ditzingen; Helmut Kretschmer, Bessenbach, and Georg Schuhmann, Leonberg, all of Fed. Rep. of Germany, assignors to Porsche AG, Weissach, Fed. Rep. of Germany

Continuation of Ser. No. 48,727, May 11, 1987, abandoned. This application Jan. 30, 1989, Ser. No. 303,989
Claims priority, application Fed. Rep. of Germany, May 9, 1986, 3615584
Int. Cl.[4] B62D *35/00*
U.S. Cl. 296—180.5 **6 Claims**



1. A spoiler arrangement for a rear engine driven motor vehicle comprising:

a spoiler extending laterally across a rear section of a vehicle and covering at least a portion of an opening to a vehicle engine and radiator accommodating space;

spoiler mounting means for mounting the spoiler for movement between an inoperative position flush with adjacent exterior vehicle body parts and an operative position spaced outwardly from the adjacent exterior body parts to enhance the vehicle aerodynamic characteristics; and

cover element means for covering gaps formed between the spoiler and vehicle body parts forming the opening when the spoiler is in said operative position whereby sucking in of exhaust gases and other contamination to said space is reliably prevented, said cover element means comprising first and second rear cover parts configured to cover a rear gap area, said first rear cover part being formed in one piece with the spoiler, and said second rear cover part being fastened to an adjusting device for moving the spoiler between its inoperative and operative positions.

4,889,383

FOLDING CHAIR

Deryl K. Jones, 336-B 16th Ave. S., Surfside Beach, S.C. 29575

Filed May 15, 1989, Ser. No. 351,481
Int. Cl.[4] A47C *4/00*
U.S. Cl. 297—16 **12 Claims**

1. A folding chair construction comprising, in combination:

(a) a back portion of essentially U-shaped configuration including a pair of parallel, first side sections, each connected at one end to opposite ends of a first medial section and extending therefrom to free ends;

(b) a seat portion of essentially U-shaped configuration including a pair of parallel, second side sections each con-

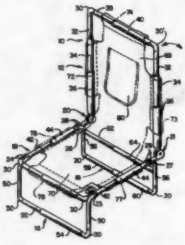
nected at one end to opposite ends of a second medial section and extending therefrom to free ends;

(c) first hinge means connecting said back and seat portions adjacent said free ends of each of said first and second side sections for pivotal movement between relatively folded and erected positions wherein said back and seat portions are in superposed and angularly disposed relation, respectively;

(d) front leg means of essentially U-shaped configuration including a pair of parallel, third side sections, each connected at one end to opposite ends of a third medial section and extending therfrom to free ends;

(e) rear leg means of essentially U-shaped configuration including a pair of parallel, fourth side sections, each connected at one end to opposite ends of a fourth medial section and extending therefrom to free ends;

(f) second hinge means connecting said front leg means and said seat portion adjacent said one ends of said second side sections and said free ends of said third side sections for pivotal movement between respective fold and erected positions wherein said front leg means and said seat portion are in supoerposed and angularly disposed relation, respectively;



(g) third hinge means connecting said rear leg means and said seat portion adjacent said free ends of each of said second and fourth side sections for pivotal movement between respective folded and erected positions wherein said front and rear leg means are in supoerposed relation and said rear leg means and said seat portion are in angularly disposed relation, respectively;

(h) each of said first and second side sections and said first, second, third and fourth medial sections comprising a plurality of tubular members connected in end-to-end relation for axial, telescoping movement between mutually extended and retracted positions; and

(i) a unitary support portion of flexible material secured to said first side and medial portions and said second side and medial portions to extend laterally between both of said first and second side sections and longitudinally between said first and second medial sections when said back and seat portions are in said erected position, and said tubular members are in said mutually extended positions.

4,889,384

KNEE-ACTION CHAIR CONTROL

James H. Sulzer, Cedarburg, Wis., assignor to Leggett & Platt, Incorporated, Carthage, Mo.

Filed Jul. 10, 1988, Ser. No. 205,383
Int. Cl.[4] A47C 3/00
U.S. Cl. 297—302 **9 Claims**

1. A chair control adapted to be mounted upon a pedestal chair base, said control comprising

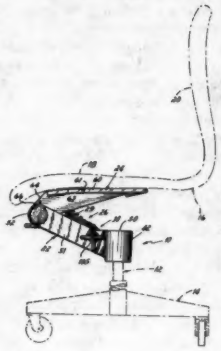
a base plate having a front portion and a rear portion,

means located adjacent the rear portion of said base plate for securement of said base plate to a vertical column of the pedestal chair base,

a seat support plate pivotally secured to said base plate for tilting movement of said seat support plate about an axis located adjacent the front of said base plate,

spring bias means including at least one compression spring operatively associated with said base plate and said seat support plate for biasing said seat support plate toward an at-rest position of said seat support plate relative to said base plate, and

an assembly locking plate mounted on the front side of one of said base plate or seat support plate and engageable with the other of said base plate or seat support plate to



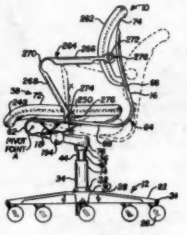
determine the at-rest position of said seat support plate relative to said base plate, said assembly locking plate being removable from its mounting on said base plate or seat support plate during assembly of said chair control so as to enable said seat support plate to be tilted beyond the at-rest position of said seat support plate relative to said base plate for compression-free assembly of said at least one compression spring between said plates and then compressed between said plates while said assembly locking plate is mounted on the front side of said one of said base plate or seat support plate.

4,889,385

CHAIR SEAT-AND-BACK SUPPORT

Donald T. Chadwick, Los Angeles, and Peter R. Glass, Capitola, both of Calif., assignors to American Seating Company, Grand Rapids, Mich.

Filed Mar. 9, 1988, Ser. No. 165,745
Int. Cl.[4] A47C 1/02
U.S. Cl. 297—302 **15 Claims**



1. A chair comprising:

a seat;

a support having a substantially U-shaped seat support including a lower leg portion with slot means extending therethrough, an upper leg portion supporting said seat

and a first bight portion intermediate said upper and lower leg portions, said first bight portion being resilient thereby enabling said upper leg portion to deflect downwardly relative to said lower leg portion in response to downward forces exerted on said upper leg portion;

support means mounting said support at said lower leg portion thereof; and

stabilizer means for providing lateral stability to said support during relative deflection of said upper leg portion, said stabilizer means being pivotally connected at an upper end thereof to said upper leg portion and at a lower end of said stabilizer means to said support means through said slot means, said pivotal connections accommodating relative deflection of said upper leg portion.

4,889,386

REAR SEAT FOR MOTOR VEHICLES

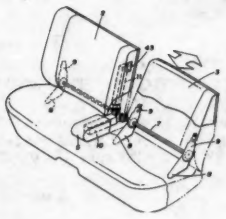
Fritz Kochy, Schlesische Strasse 24, 6500 Mainz; Bernhard Neumann, Bohmerwaldstrasse 2, 6090 Russelsheim 7, and Rolf Horn, Nibelungenstrasse 26, 6090 Russelsheim, all of Fed. Rep. of Germany

Continuation-in-part of Ser. No. 90,786, Aug. 8, 1987, abandoned. This application Apr. 10, 1989, Ser. No. 336,554

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1986, 3628587

Int. Cl.[4] B60N *1/06*

U.S. Cl. 297—359 **1 Claim**



1. A rear seat for motor vehicles with an adjustable back rest mounted on a shaft through a rotary gear type adjuster means, said adjuster means including a gear member mounted on said shaft, in the center of said back rest is located a folding center arm rest, said folding center arm rest is mounted on said shaft, said rear seat characterized in that the operating elements for said adjuster means of said back rest are disposed in the region of the opening for said center arm rest and that said center arm rest conceals the operating elements for the back rest adjuster means, and said adjuster means is constructed as a ratchet means and is incorporated into the center arm rest to engage said gear member mounted onto said shaft, and the tilt of the back rest is adjusted by moving said center arm rest up and down, and a ratchet lever for controlling said ratchet means is incorporated into said center arm rest.

4,889,387

CHAIR MEMBER

Peter G. G. Gregory, 3 Kings Place, Carlingford, New South Wales, Australia

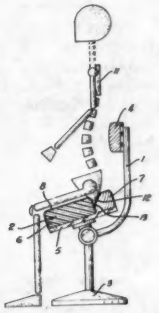
Continuation of Ser. No. 174,796, Jan. 19, 1988, abandoned. This application Apr. 10, 1989, Ser. No. 336,590

Claims priority, application Australia, May 26, 1986, PH6094

Int. Cl.[4] A47C *7/02*

U.S. Cl. 297—458 **6 Claims**

1. A chair having a seat member and a backrest for supporting a person sitting on said chair, said seat member including a forward support portion of relatively high resistance to resilient deformation and an adjacent rear support portion of relatively low resistance to resilient deformation, the forward support portion possessing a higher resistance to resilient deformation than the resistance to resilient deformation of the rear support portion, said forward and rear support portions defining a substantially transverse crevice therebetween extending substantially parallel to said backrest such that, in use, said crevice extends substantially transversely with respect to longitudinal axes of the sitter's thighs with the forward support portion substantially forward of the sitter's ischial tuberosities, such that the weight of a person sitting on the chair causes



differential deformation whereby said rear support portion is deformed to an extent greater than said forward support portion thereby resiliently opening said crevice and locating the sitter's ischial tuberosities at least partly within said crevice behind said forward support portion thereby resisting forward movement of the sitter on the seat member by exerting a rearwardly directed pressure on said ischial tuberosities such that the sitter is supported in an ergonomically correct posture.

4,889,388

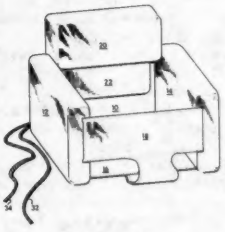
TRANSPORTABLE SEAT INSERT ESPECIALLY ADAPTED FOR INFANTS

Sherry R. Hime, 11444 W. Hawaii Ave., Lakewood, Colo. 80226

Filed Jun. 29, 1988, Ser. No. 212,797

Int. Cl.[4] A47C *3/00*

U.S. Cl. 297—464 **24 Claims**



1. A transportable seat insert for supporting a human in a sitting position, said insert fashioned substantially entirely of non-rigid, flexible, compressible materials, said insert comprising:

a substantially upstanding back portion having an upper, a lower, and opposing lateral edges, said back portion formed in an upper section and a lower section;

means for selectively attaching said upper section to said lower section;

a pair of substantially upstanding side portions each having an upper, a lower, and opposing lateral edges, one lateral edge of each side portion being connected to a corresponding one of the lateral edges of said back portion, said

side portions being spaced apart and substantially parallel to each other;

a bottom portion extending between and connected to the bottom edge of said back portion and the bottom edges of each of said side portions; and

a front portion connected to the other lateral edges of each of said side portions and connected to said bottom portion, said front portion possessing a configuration providing a pair of openings through which the human's legs are adapted to extend.

4,889,389

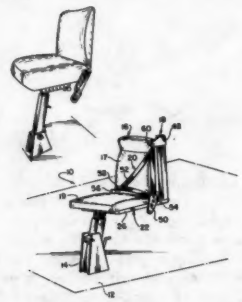
SEAT WITH THREE POINT USER RESTRAINT

David A. White, White Pigeon, Mich., assignor to Grumman Allied Industries, Inc., Sturgis, Mich.

Continuation of Ser. No. 108,058, Oct. 13, 1987, abandoned. This application Dec. 23, 1988, Ser. No. 291,384

Int. Cl.[4] A62B *35/00*

U.S. Cl. 297—468 **2 Claims**



1. A three point user restraint for a vehicle seat, comprising:

(a) a seat frame including a seat pedestal to which is mounted a means to mount the seat within a vehicle, said seat pedestal including a vertical mounting arm at the rear thereof with a brace between the pedestal and the arm to maintain the vertical extension of the mounting arm and further including a belt loop means affixed to the end of the mounting arm above said pedestal;

(b) a seat belt retractor bracket attached for pivotal movement to the side of said seat pedestal:

(c) a seat belt retractor means mounted to said retractor bracket, said seat belt retractor means including a seat belt having an end that extends upwardly from said retractor means through said belt loop means and back to said seat pedestal means on the side thereof mounting said seat belt retractor bracket:

(d) a tongue slidably mounted on said seat belt for movement therealong between said seat belt retractor means and the point of attachment of the seat belt with said pedestal: and

(e) a belt buckle attached to said seat pedestal on the side thereof opposite to that to which said seat belt retractor means is mounted, said belt buckle being adapted to receive said tongue whenever it is desired to extend said seat belt over the shoulder and around the lap of a user of said seat in restraint thereof to said seat.

4,889,390

TIPPING TRAYS

Lyall J. Campbell, Milford, New Zealand, assignor to Camryde Industries Limited, Auckland, New Zealand

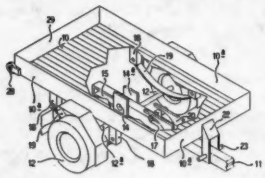
Filed Dec. 22, 1987, Ser. No. 137,431

Claims priority, application New Zealand, Dec. 23, 1986, 218775

Int. Cl.[4] B60P *1/12*

U.S. Cl. 298—5 **10 Claims**

1. A wheeled vehicle with front latching means comprising a chassis incorporating a tow bar at a front end; a tipping tray secured to at least one axial member supporting ground wheels; articulation means comprising a pivot with a transversely disposed axis, secured to the tray; guiding means secured to the chassis and adapted to slidably accommodate for longitudinal displacement said articulation means; camming means longitudinally spaced apart from the articulation means and comprising at least one cam and one cam follower, the cam being secured to the tray and the cam follower being secured to the chassis and adapted to cooperate to alter the angular disposition of the tray between a carriage position and a discharge position when a sudden change in the vehicle's inertia causes a net rearward force on the tipping tray causing the



pivot to be moved longitudinally of the guiding means in so doing the camming action of the camming means articulating the tray about the axis of the pivot, whilst latching means adapted to maintain the disposition of the chassis and tray relative to one another are disengaged, and wherein, in the carriage position, the tray is in a substantially parallel relationship with the chassis, and the cam follower is disposed at the beginning of the cam.

4,889,391

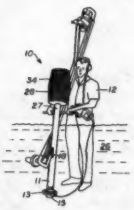
HAND-HELD SUCTION DREDGE AND METAL DETECTOR

Billie G. Cornelius, 15515 Lee Rd., Houston, Tex. 77032

Filed May 8, 1989, Ser. No. 348,594

Int. Cl.[4] E02F *7/00, 3/94;* **G01V** *3/08*

U.S. Cl. 299—9 **21 Claims**



1. A hand-held suction dredge and metal detector comprising

a hollow pipe adapted to be carried in a vertical position,

a metal detector having a central aperture supported for sliding movement on said pipe with the lower pipe end extending therethrough for receiving and transmitting at least partially fluid material therethrough,

spring means urging said metal detector toward an initial position at the lower end of said pipe,

fluid jet means positioned in said pipe directed upward therein,

pump means supported by said pipe and connected to said fluid jet means to circulate fluid therethrough to create a suction in said pipe to draw at least partially fluid material from said bottom end through said pipe to discharge the same from the upper end of said pipe, and

basket means supported on the upper end of said pipe having openings sized to permit discharge of at least partially fluid material and retain larger metal solids therein,

said pipe being operable in use to support said metal detector adjacent to a region being investigated and to dredge

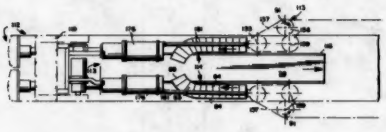
material therefrom by operation of said pump means and, a motor means supported by said pipe above the upper end of said pipe for operating said pump means.

4,889,392

ADVANCE/RETREAT CUTTING MINER AND METHOD

James C. Justice, and Frank A. Delli-Gatti, Jr., both of Beckley, W. Va., assignors to Coaltex, Inc., Beckley, W. Va.

Filed Feb. 28, 1989, Ser. No. 316,895
Int. Cl.[4] E21C 27/22, 41/00
U.S. Cl. 299—18 **20 Claims**



1. A mining machine for mining an area, comprising:
a frame;
a front cutting means mounted adjacent the front of said frame;
a first conveying means for conveying cut material, from a front portion of the frame to the rear, and ultimately out of the area being mined;
a second conveying means mounted in back of said front cutting means, for conveying cut material from adjacent the rear portion of the frame toward the front, to be deposited on said first conveying means; and
a rear cutting means located to the rear of said second conveying means for cutting material to be moved to said second conveying means as said machine is moving rearwardly.

20. A method of mining material in an area where no operator will be present, comprising the steps of:
(a) cutting into the area to be mined using a mining machine by moving the mining machine in a forward direction, to form a bore having given first dimensions;
(b) removing cut material as the mining machine is moved in the forward direction by moving the material rearwardly out of the area being mined;
(c) terminating forward movement into the area being mined, and then moving the mining machine rearwardly out of the bore while continuing to cut material so as to enlarge the bore from said first dimensions to second dimensions greater than said first dimensions; and
(d) conveying the material cut during rearward movement first in a forward direction, and then ultimately rearwardly so that it moves out of the area being mined in the same manner that the material cut during forward movement is moved out of the area being mined.

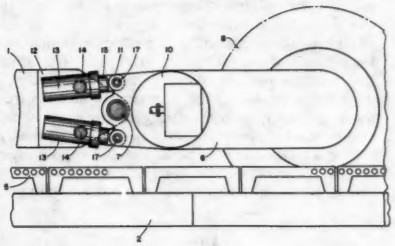
4,889,393

DRUM CUTTER-LOADER FOR UNDERGROUND MINING MACHINE

Herbert Schupphaus, Bochum, Fed. Rep. of Germany, assignor to Gebr. Eickhoff Maschinenfabrik u. EisengieBerei mbH, Bochum, Fed. Rep. of Germany

Filed Oct. 24, 1988, Ser. No. 261,102
Claims priority, application Fed. Rep. of Germany, Nov. 14, 1987, 3738801
Int. Cl.[4] F21C 25/08, 27/00
U.S. Cl. 299—42 **8 Claims**

1. In a drum cutter-loader machine for an underground long wall mining operation having a machine body and a cutting drum traversable longitudinally along said wall,
said body having a limiting height characteristic extending in a direction parallel to said wall such as to assure passage of said body in a minimum height long wall mining condition,
a support arm for the drum mounted on one end of said body, such that the inner end of said arm is connected to said body and its outer end is connected to the drum, said arm being pivotally carried by said body about an axis generally parallel to the mine floor, driving motor means for driving the drum,
a protective housing for said motor means,
means for mounting said housing at said inner end of said arm on the side thereof opposite the side to which the drum is connected and in a manner that the motor means and housing extends away from said arm so that the axis of the housing is arranged parallel to the axis of the drum,
said motor means and housing being arranged to extend in



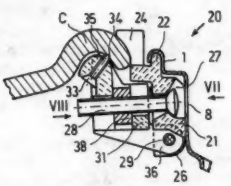
line with and in front of said body and characterized so as not to exceed said height of said body,
said housing and body having first means for pivotally connecting said housing to said body,
pressure cylinders arranged transversely of said body and between said arm and said body for rotating said arm,
said housing having second means on one side of said first pivotal connection for pivotally connecting one end of said cylinders to said housing,
third pivotal means for pivotally connecting a second end of said cylinders to said body, and
said first, second and third means having their axes generally parallelly arranged and being located within said height of said body, in a manner that said cylinders are maintained at all times during their operations within said height of said body.

4,889,394

MOUNTING ARRANGEMENT FOR POSITIVELY FIXING A WHEEL COVER DISK TO THE WHEEL RIM OF AN INDUSTRIAL VEHICLE

Renzo Ruspa, Rotta Magnabergera 8, i-10070 Fiano Torinese, Italy

Filed Jul. 1, 1988, Ser. No. 222,512
Claims priority, application Italy, Jul. 23, 1987, 67641 A/87
Int. Cl.[4] B60B 7/06
U.S. Cl. 301—37 PB **4 Claims**



1. A vehicle wheel cover disk having a mounting arrange-

ment in order to allow positively fixing the cover disk to a wheel rim ending outside with a concave channel edge, wherein the mounting arrangement includes at least three connection devices spaced along the disk periphery in order to engage the concave channel edge of the wheel rim, and wherein at least one of said connection devices is movable and comprises an engagement member displaceable between a mounting position, in which it may pass inside said channel edge of the wheel rim, thus allowing mounting the cover disk onto the wheel, and a fixing position in which it engages said channel edge of the wheel rim, thus positively fixing the wheel cover disk; wherein each movable connection device comprises:

a supporting member having means for being mounted onto the peripheral edge of the cover disk;

an engagement member movable connected to said supporting member and movable between a mounting position and a fixing position, said engagement member having a first projection suitable for engaging, in the fixing position of said engagement member, the concave channel edge of the wheel rim, and for passing inside said channel edge in the mounting position of said engagement member;

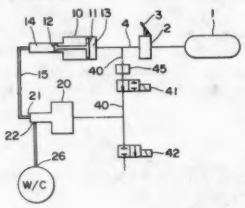
and means for displacing said engagement member from the mounting position to the fixing position and viceversa; said means for displacing the engagement member comprising a traction screw, housed in said supporting member, and a threaded nut housed in said engagement member, said traction screw being screwed into said nut.

4,889,395

ANTI-LOCK CONTROL APPARATUS FOR AIR OVER HYDRAULIC BRAKE SYSTEM

Tomohiro Fujita, Hanyu, and Ryuji Kawano, Kohnosu, both of Japan, assignors to Akebono Brake Industry Co., Ltd., Tokyo, Japan

Filed Mar. 2, 1989, Ser. No. 317,846
Claims priority, application Japan, Mar. 4, 1988, 63-51296
Int. Cl.[4] B60T *8/42*
U.S. Cl. 303—115 **8 Claims**



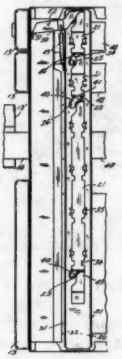
1. An anti-lock control apparatus for an air over hydraulic brake system wherein a brake valve is connected to an air pressure source, said brake valve is connected to a pneumatic chamber of an air master cylinder through a first air pressure line, a hydraulic chamber of said air master cylinder is connected to a liquid input port of a modulator, a valve device is interposed in a passage between said liquid input port of the modulator and a liquid output port thereof, said valve device is arranged such as to be capable of being opened by a hydraulic piston fitted in the modulator, a pneumatic piston is connected to said hydraulic piston, and said liquid output port of said modulator is communicated with a hydraulic chamber of said modulator and is connected to a wheel cylinder, a pneumatic chamber of said modulator is connected to the brake valve via a second air pressure line, and air pressure in said modulator pneumatic chamber is controlled by a first valve apparatus, said anti-lock control apparatus for an air over hydraulic brake system comprising: a second valve apparatus provided to leave a prescribed amount of residual pressure in said modulator pneumatic chamber at the time of the release of braking.

4,889,396

DRAWER INTERLOCK

Terry L. Mitchell, Jenison; Fredrick E. Sutton, Grand Rapids, and Todd A. Sutton, Spring Lake, all of Mich., assignors to G. A. Richards Company, Grand Rapids, Mich.

Filed Dec. 12, 1988, Ser. No. 283,166
Int. Cl.[4] E05C *7/06*
U.S. Cl. 312—221 **6 Claims**



1. An improved drawer interlock combination in prevention of opening plural stacked drawers simultaneously and preventing a second drawer from opening when one drawer is opened, comprising:

a plurality of drawer blocking rotors in spaced apart vertical relation each having a central journal means, a tank extension offset from said journal means providing engaging means in interference engagement with corresponding of said drawers for limited movement when said corresponding drawer is opened and closed;

an elongate frame to which said rotors are rotationally connected and through which said tangs extend in spaced relation and limiting the arcuate rotation of said tangs and said frame including a lower stop beneath said lowermost tang;

a plurality of actuators in end to end relation guidable in limited vertical movement in said frame, and each notched at its uppermost end and each liftingly movably engaged by said tang through a distance substantially equal to the thickness of said tangs in their upper extreme of arcuate travel, the lowermost of said actuators normally resting on said lower stop of said frame.

4,889,397

INTEGRATED MODULAR PORTABLE MAIL TRAY DELIVERY SYSTEM AND COMPONENTS

Patrick J. Ryan, Reseda, Calif., assignor to Alpha Mail System, Simi Valley, Calif.

Filed Jan. 13, 1988, Ser. No. 143,647
Int. Cl.[4] A47B *88/00*
U.S. Cl. 312—320 **14 Claims**

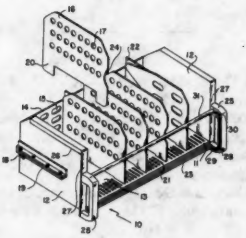
1. A portable postal tray for sorting and distributing mail comprising:

a bottom, an open top, rigid oppositely disposed sides attached to said bottom and at least one open side;

a handle means for picking-up said containers, said handle means being disposed adjacent to said sides and containing a groove having an upper retention position and a lower storage position substantially at or below said bottom; and

gate disposed within said groove movable between said upper retention position and said lower storage position, said gate selectively providing free access for mail sorting

through said open side when the gate is in said storage position and said gate preventing items held in said tray



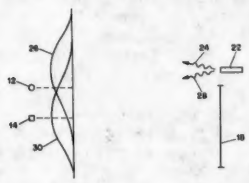
from accidently being dislodged from said open side of said tray when the gate is in the upper retention position.

4,889,398

SELF REFERENCING AMBIGUITY FREE HOLOGRAPHY

Marek Elbaum, Dobbs Ferry, N.Y.; Dina Gutkowicz-Krusin, Princeton, N.J., and Jerzy Nowakowski, Bayside, N.Y., assignors to Riverside Research Institute, New York, N.Y.

Filed Apr. 5, 1988, Ser. No. 177,667
Int. Cl.[4] G03H *1/04, 1/22, 1/28*
U.S. Cl. 350—3.67 **34 Claims**



1. A method for self-reference holographic imaging comprising illuminating an object with at least two radiation beams having different non-uniform spatial radiation characteristics across said object; detecting holograms of said objects for each of said radiation beams which are generated as a result of interference between radiation reflected by said object and radiation reflected by at least one reference reflector; and analyzing said holograms to form an unambiguous holographic image.

4,889,399

EXPANDED BEAM CONNECTOR FOR OPTICAL FIBERS

Beniamino Mariani, Vendano al Lambro, and Bruno Bortolin, Cinisello Balsamo, both of Italy, assignors to Società Cavi Pirelli S.p.A., Milan, Italy

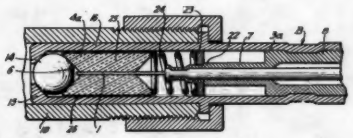
Continuation-in-part of Ser. No. 249,784, Sep. 27, 1988, Pat. No. 4,846,544. This application Oct. 26, 1988, Ser. No. 262,976
Claims priority, application Italy, Oct. 29, 1987, 22447 A/87
Int. Cl.[4] G02B *6/36*
U.S. Cl. 350—96.2 **10 Claims**

1. An expanded beam optical fiber connector comprising:

a hollow cylindrical sleeve having a conical seat therewithin and at one end thereof, said seat having a central opening therein and facing toward the opposite end of said sleeve;

a hollow cylindrical body for receiving an optical fiber within and secured to said sleeve, said body having an end spaced from said seat;

a cylindrical optical fiber supporting element within said sleeve intermediate said one end of said sleeve and said end of said body, said supporting element having a central bore for receiving an optical fiber therein and having a conical seat around said bore at the end thereof near said one end of said sleeve, the last-mentioned said conical seat facing and being spaced from the first-mentioned said conical seat and said supporting element being without a rigid connecting with said sleeve and said body and having an exterior diameter less than the interior diameter of said sleeve to provide a clearance between the exterior surface of said supporting element and the interior surface of said sleeve which permits said supporting element to move transversely of the axis of said sleeve;



elastic means interconnecting said supporting element and said hollow cylindrical body and permitting said supporting element to move transversely of the axis of said sleeve; and

a spherical lens mounted between and engaging the first-mentioned said conical seat and the second-mentioned said conical seat

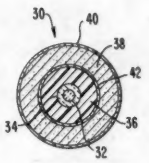
whereby the centering between the spherical lenses and the optical fiber ends is automatically obtained through the elasticity of the connection of the hollow cylindrical body to the supporting element.

4,889,400

THERMAL RESISTIVITY COATINGS FOR OPTICAL FIBERS

George T. Pinson, Huntsville, Ala., assignor to The Boeing Company, Seattle, Wash.

Filed Aug. 8, 1988, Ser. No. 229,502
Int. Cl.[4] G02B *6/10*
U.S. Cl. 350—96.3 **16 Claims**



1. Apparatus for protecting an optical fiber from an incident laser beam comprising:

protective coating means surrounding the optical fiber, wherein said protective coating means includes a layer of intumescent material selected to react at the heat input levels of the incident laser beam and to insulate the surrounded optical fiber against heat damage.

4,889,401

BIREFRINGENT OPTICAL WAVEGUIDE STRUCTURE HAVING A STRIP WAVEGUIDE BURIED IN A CLADDING LAYER AND THE METHOD OF MANUFACTURING

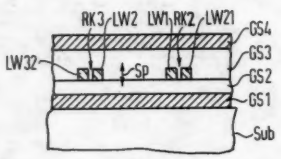
Ekkehard Klement, Graefelfing; Hartmut Schneider, Munich; Holger Karstensen, Munich, and Helmut Zrschizky, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 15, 1988, Ser. No. 219,579

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1987, 3732407

Int. Cl.[4] G02B 6/10

U.S. Cl. 350—96.12 14 Claims



1. A birefringent optical waveguide structure comprising at least one strip waveguide of a first material being buried in a cladding layer of a second material, each strip waveguide having a longitudinal axis, said cladding layer with the strip waveguide being positioned between two additional layers, said first material having an index of refraction higher than the index of refraction of the second material and both of the additional layers applying a mechanical stress on the cladding layer and on each strip waveguide with a component of the stress extending perpendicular to the longitudinal axis of the waveguide.

4,889,402

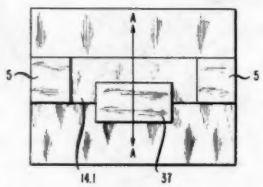
ELECTRO-OPTIC POLARIZATION MODULATION IN MULTI-ELECTRODE WAVEGUIDES

Franz K. Reinhart, Summit, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 239,076, Aug. 31, 1988, abandoned, which is a continuation of Ser. No. 110,067, Oct. 15, 1987, abandoned, which is a continuation of Ser. No. 455,670, Jan. 5, 1983, abandoned. This application Apr. 21, 1989, Ser. No. 342,712

Int. Cl.[4] G02B 6/10

U.S. Cl. 350—96.14 6 Claims



1. An optical device comprising

a substrate-supported waveguide, said waveguide consisting essentially of an electro-optic material in a waveguiding structure having a preferred direction of light propagation,

first and second electrodes disposed at least in part on said waveguide and spaced apart in said direction, the space between said electrodes comprising means for adjusting the phase of optical radiation in said waveguide, and

an electrical signal source connected to said electrodes such that the same signal is applied to said first and second electrodes.

4,889,403

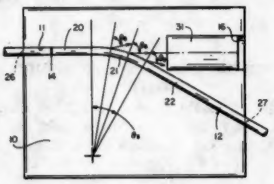
DISTRIBUTION OPTICAL FIBER TAP

Joseph Zucker, Foster City; Nelson M. Shen, Palo Alto; Bruce D. Campbell, Portola Valley, all of Calif.; Peder Rodhe, Gothenburg, Sweden, and Tom Call, Columbus, Miss., assignors to Raychem Corp., Menlo Park, Calif.

Continuation-in-part of Ser. No. 117,390, Nov. 2, 1987, abandoned, which is a continuation-in-part of Ser. No. 53,209, May 21, 1987, abandoned. This application Dec. 23, 1987, Ser. No. 137,317

Int. Cl.[4] G02B 6/26

U.S. Cl. 350—96.15 17 Claims



1. An apparatus, comprising:

a first optical fiber tap, the first tap including:

a substrate having a substantially flat upper surface on which a curved first grooved is formed and on which a second groove is formed, a first end of the second groove being displaced from and confronting the first groove;

an optical fiber including a core surrounded by a cladding surrounded by a coating disposed at least partially within the first groove, a width of the first groove being substantially greater than a cladding diameter and such that a bend profile of the coating is maintained substantially constant;

means for collecting light radiating from a bent portion of the optical fiber which passes through the fiber coating and into the substrate from the first groove, the light collecting means including a light collection element disposed within the second groove so that a light collection end surface thereof is adjacent the first end of the second groove;

a bend radius of an intermediate portion of the optical fiber in the first groove being between 4 and 11 millimeters and its sector angle being greater than 9° and less than 35°.

4,889,404

ASYMMETRICAL BIDIRECTIONAL TELECOMMUNICATION SYSTEM

Venkata A. Bhagavatula, Big Flats, and David E. Charlton, Corning, both of N.Y., assignors to Corning Incorporated, Corning, N.Y.

Continuation-in-part of Ser. No. 94,504, Sep. 9, 1987, abandoned. This application Oct. 19, 1988, Ser. No. 259,723

Int. Cl.[4] G02B 6/22, 6/36; H04B 9/00

U.S. Cl. 350—96.16 14 Claims

1. An asymmetrical bidirectional optical communication system comprising

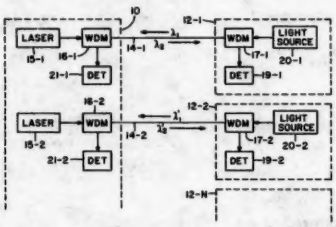
first and second stations,

bidirectional optical transmission means for transmitting optical signals between said stations,

a first source of radiation at said first station for propagating at a wavelength λ_2 through said optical transmission

means an information-carrying optical signal with a total dispersion less than 5 ps/km-nm, and

a second source of radiation at said second station for at a



wavelength λ_1 through said optical transmission means a few-mode optical signal with a bandwidth greater than 1 GHz-km, said wavelength λ_2 being shorter than said wavelength.

4,889,405

METHOD AND APPARATUS FOR INTERCONNECTING OPTICAL WAVE GUIDES

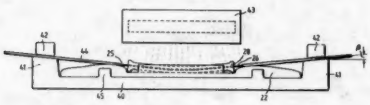
Robert Walker, Buff Point; Robert Fitzgerald, Bateau Bay, and Hans-Dieter Bippus, Holgate, all of Australia, assignors to Krone Aktiengesellschaft, Berlin, Fed. Rep. of Germany

Filed Sep. 29, 1988, Ser. No. 250,903

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 3733469; Jan. 23, 1988, 3802240

Int. Cl.[4] G02B 6/36

U.S. Cl. 350—96.21 11 Claims



1. A connecting element for beam wave guides, comprising;

a carrier shell having a guide notch extending longitudinally

a cover shell having a continuous longitudinal groove of generally rectangular cross-section for receipt of the carrier shell, of generally rectangular cross-section, said cover shell having lateral resilient rib portions which may be expanded for positioning said carrier shell in said cover shell longitudinal groove and said rib portions acting to lock said carrier shell in said longitudinal groove, said cover shell having guide notches formed in the longitudinal groove, said cover shell having a guide notch cooperating with said carrier shell guide notch to form a guide groove, said guide groove being continuous and having a subtantially constant cross section over the length of said cover shell and said carrier shell, said guide groove cooperating with said carrier shell and said cover shell to define a first end section, a longitudinal middle section and a second end section, said longitudinal middle section being positioned between said first and second end sections, said guide groove being curved in said first and second end section, said guide groove being straight in said longitudinal middle section and said guide groove being curved in said second end section.

4,889,406

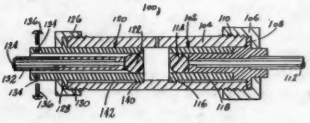
TILT ADJUSTABLE OPTICAL FIBRE CONNECTORS

Omur M. Sezerman, P.O. Box 11218, Station H, Nepean, Ontario, Canada K2H 7T9

Continuation-in-part of Ser. No. 847,416, Apr. 3, 1986, Pat. No. 4,753,510. This application Jun. 23, 1988, Ser. No. 210,388

Int. Cl.[4] G02B 6/38

U.S. Cl. 350—96.21 14 Claims



4. A coupling device for optically coupling a pair of optical fibres in end-to-end relation, each of said fibres terminating at a beam expanding or imaging lens, at least one of said lenses being spherical, comprising: elongated cylindrical housing means; first ferrule means mounting one of said fibres and an associated lens and having means engageable with said housing means to secure said first ferrule means within said housing means at a predetermined position therein; second ferrule means containing said spherical lens therein and carrying a fibre holder surrounding the other of said fibres, said second ferrule means being positionable within said housing means with the spherical lens thereof adjacent the lens of said first ferrule means; and radially extending securing and adjusting means extending through said second ferrule means for engagement with said fibre holder away from said spherical lens; whereby said securing and adjusting means are individually displaceable to effect angular adjustment of said fibre holder relative to said housing means and said first ferrule means so as to optimize the light energy transmissible from one fibre and its lens to the other lens and its fibre.

4,889,407

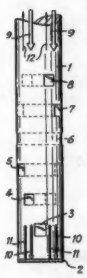
OPTICAL WAVEGUIDE SENSOR AND METHOD OF MAKING SAME

David R. Markle, Paoli, Pa.; Barry C. Crane, Aston Clinton, and Michael P. Irvine, London, both of England, assignors to Biomedical Sensors Limited, High Wycombe, England

Filed Dec. 2, 1988, Ser. No. 279,384

Int. Cl.[4] G02B 6/02; A61B 5/00; B23K 9/00; G01N 33/48

U.S. Cl. 350—96.29 22 Claims



1. An optical waveguide sensor for determining an analyte in a medium, which sensor comprises an optical waveguide having a portion to be brought into contact with said medium, said portion having a plurality cells arranged in an array which substantially covers the cross-sectional area containing an indicator sensitive to said analyte.

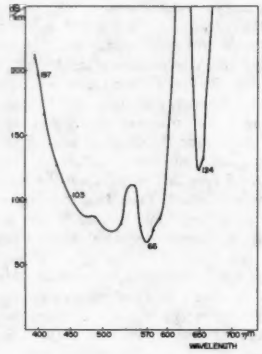
11. A method for the preparation of an optical waveguide sensor for determining an analyte in a medium, which comprises selecting a portion of said waveguide, subjecting said portion to means for forming one or more cells within the waveguide, immersing said portion in a medium containing an indicator sensitive to said analyte and evacuating said one or more cells until each of said cells is filled with said indicator.

4,889,408

PLASTIC OPTICAL FIBER LESS ATTENUATING LIGHT AND PROCESS FOR PRODUCING THE SAME

Shinichi Teshima, Yokohama, Japan, assignor to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Nov. 4, 1986, Ser. No. 926,516
Int. Cl.[4] B32B *27/00*; G02B *6/00*
U.S. Cl. 350—96.34 3 Claims



1. A plastic optical fiber comprising a core polymer constituted mainly of methyl methacrylate and a cladding polymer having a lower refractive index than that of the core polymer,

said core polymer consists of a methyl methacrylate homopolymer or a copolymer constituted of at least 95% by weight of methyl methacrylate and less than 5% by weight of methyl acrylate, ethyl acrylate or a mixture thereof and having a weight-average molecular weight of from 80,000 to 200,000,

said cladding polymer comprises

(a) 40 to 80% by weight of 2-(perfluorooctyl)ethyl methacrylate represented by the formula

$$CH_2=C(CH_3)-COOCH_2CH_2(CF_2)_7CF_3,$$

(b) 15 to 50% by weight of at least one monomer selected from short-chain fluoroalkyl methacrylates represented by the formula

$$CH_2=C(CH_3)-COOCH_2(CF_2)_nX,$$

wherein X is H or F and n is an integer of 1 to 4, and

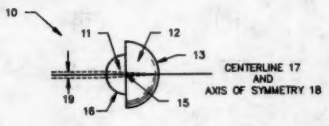
(c) 0 to 10% by weight of methyl methacrylate, and exhibits a melt flow index of 10 to 200 g/10 min. at 230° C., refractive index n_D^{20} of 1.39 to 1.42, and Vicat softening temperature of 50° to 85° C., and that light attenuations through the fiber are up to 250, 130, 80, and 130 dB/Km at wavelengths of 400, 450, 570, and 650 nm, respectively.

4,889,409

HEMISPHERICAL RETROREFLECTOR

Paul D. Atcheson, Boulder, Colo., assignor to Ball Corporation, Muncie, Ind.

Filed Feb. 16, 1988, Ser. No. 156,185
Int. Cl.[4] G02B *5/126*
U.S. Cl. 350—104 15 Claims



1. A retroreflector which comprises:

(a) a first hemisphere having radius r1 and comprising

(i) a transparent spherical surface which, during use receives incident radiation, and

(ii) a transparent planar surface, and

(b) a second hemisphere having radius r2 wherein r2/r1 signals 1/(n-1), wherein n is the index of refraction of the hemispheres determined at the design wavelength of the retroreflector and the index of refraction of the two hemispheres is less than 2, said second hemisphere comprising:

(i) a specular spherical surface which, during use reflects incident radiation substantially focused thereon, and

(ii) a transparent planar surface wherein the planar surface of said first hemisphere is centrally adjoined to the planar surface of said second hemisphere, and

wherein radiation reflected from said retroreflector propagates along a path substantially parallel to the path of said incident radiation.

4,889,410

MAGENTA FILTERS

James K. Elwood, Victor, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 6, 1988, Ser. No. 240,326
Int. Cl.[4] G02B *5/22*; G03C *1/02*
U.S. Cl. 350—317 15 Claims

1. In a color filter array comprising sets of differently colored filters, the improvement wherein one set of colored filters comprises an indolocarbocyanine dye in which the 3-carbon atom of each indole nucleus has bonded thereto at least one alkyl group which has from 3 to 12 carbon atoms and which is unbranched at the first carbon atom thereof.

4,889,411

PROCESS AND STRUCTURE FOR THIN FILM TRANSISTOR WITH ALUMINUM CONTACTS AND NONALUMINUM METALLIZATION IN LIQUID CRYSTAL DISPLAYS

Harold G. Parks; William W. Piper, both of Scotia; George E. Possin, and Donald E. Castleberry, both of Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 241,271, Sep. 7, 1988, Pat. No. 4,855,806, which is a continuation of Ser. No. 127,024, Nov. 30, 1987, abandoned, which is a continuation of Ser. No. 761,939, Aug. 2, 1985, abandoned. This application Apr. 10, 1989, Ser. No. 335,262
Int. Cl.[4] G02F *1/133*
U.S. Cl. 350—334 17 Claims

1. An active matrix liquid crystal display comprising:

a pair of flat substrates, at least one of which is transparent;

a quantity of liquid crystal material disposed and contained between said substrates;

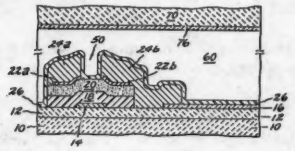
an array of indium tin oxide pixel electrodes disposed on said at least one substrate;

at least one ground plane electrode disposed on the other one of said substrates, so that liquid crystal material is disposed between said pixel electrodes and said ground plane electrodes;

a set of electrically conductive data lines;

a set of electrically conductive gate lines;

an array of inverted semiconductor switch elements associated with said pixel electrodes, each of said switch elements including a gate electrode electrically connected to said gate lines, said switch elements also including a silicon layer disposed over a gate insulation layer so as to



form an island configuration and a layer of aluminum disposed over said silicon layer in each switch element, said aluminum layer having an insulative gap therein which is located over said gate electrode so as to define a field effect transistor with source, gate and drain, said switch element gate electrodes being connected to one of said gate lines, and said source and drain being connected via source and drain lines either to one of said data lines or said pixel electrodes through said aluminum layer, said drain lines and said gate lines comprising material other than aluminum.

4,889,412

LIQUID CRYSTAL CELL USING THE ELECTRICALLY CONTROLLED BIREFRINGENCE EFFECT AND A UNIAXIAL MEDIUM OF NEGATIVE OPTICAL ANISOTROPY USABLE THEREIN

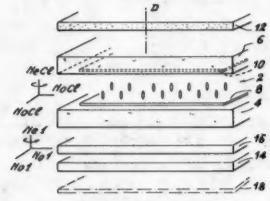
Jean-Frédéric Clerc, Saint-Egrève; Jean-Claude Deutsch, Grenoble; Pierre Vaudaine, Grenoble, and Sylvie Vey, Grenoble, all of France, assignors to Commissariat A l'Energie Atomique, Paris, France

Filed Feb. 17, 1987, Ser. No. 15,746

Claims priority, application France, Feb. 28, 1986, 86 02855

Int. Cl.[4] G02F *1/13*

U.S. Cl. 350—347 E **14 Claims**



1. A liquid crystal cell assembly using the electrically controlled birefringence effect and having spaced apart sides, one of which is exposed to an incident light, said assembly comprising:

a nematic liquid crystal molecular layer of positive optical anisotropy;

at least two electrodes, one on either side of said liquid crystal layer, with the electrode located on said one side exposed to incident light being transparent;

the molecules of said liquid crystal layer being substantially oriented in a homeotropic direction in the absence of a voltage between said electrodes;

at least one means for polarizing said incident light located on said one side exposed to said incident light; and

at least one layer of medium for compensating the birefringence of said nematic liquid crystal layer in its homeotropic structure for improving oblique observation of said cell, said medium having three principal optical indices each corresponding to an axis, one of said indices being weaker than the other two indices, and that axis which corresponds to said weak index being parallel to said homeotropic direction.

4,889,413

MANUFACTURE OF PHOTOCHROMIC ARTICLES

Mary E. Ormsby, Lancashire, and William R. Maltman, Merseyside, both of England, assignors to Pilkington plc, Merseyside, England

Filed May 19, 1988, Ser. No. 195,873

Claims priority, application United Kingdom, May 22, 1987, 8712210

Int. Cl.[4] G02F *1/17*

U.S. Cl. 350—354 **22 Claims**

1. A process for producing polyurethane plastics having photochromic properties from at least one di-isocyanate compound and at least one polyol, which process comprises selecting at least one di-isocyanate compound together with at least one polyol and a polyurethane polymerisation catalyst, incorporating a reversible cleavage photochromic compound into at least one of the selected at least one di-isocyanate compound and the selected at least one polyol; forming a mixture including the photochromic compound; and polymerising the mixture to form a polyurethane incorporating the said photochromic compound.

4,889,414

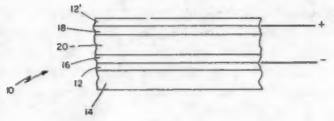
LIGHT MODULATING DEVICE

R. David Rauh, Newton, and Ronald B. Goldner, Lexington, both of Mass., assignors to EIC Laboratories, Inc., Norwood, Mass.

Continuation-in-part of Ser. No. 642,956, Aug. 21, 1984. This application Sep. 25, 1985, Ser. No. 779,872

Int. Cl.[4] G02F *5/23*; G02B *1/01*

U.S. Cl. 350—357 **27 Claims**



1. A device for transmitting light comprising means for controlling the transmissivity of said device,

said transmissivity controlling means comprising

(a) a ceramic, reversibly electrochromic, crystalline element having a highly reflective state when injected with electrons and charge compensating ions and a highly transmissive state when said electrons and said ions are removed, said crystalline element being characterized as having a reflectivity of at least 50% in said reflective state and not greater than 10% in said transmissive state, and

(b) means for modulating said crystalline element between said reflective and said transmissive states by injecting ions into said crystalline element in response to an applied electrical current of a first polarity and removing said ions in response to an applied electrical current of a second polarity.

4,889,415

LIGHT BEAM DEFLECTOR DEVICES

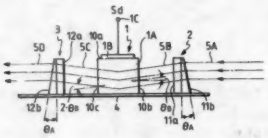
Nubuhiko Umezu, Chiba, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jun. 27, 1988, Ser. No. 212,222

Claims priority, application Japan, Jul. 10, 1987, 62-105316[U]

Int. Cl.⁴ G02F *1/11*

U.S. Cl. 350—358 **7 Claims**



1. A light beam deflection device comprising:

an acoustooptic element including a piezoelectric crystal base with a first flat surface and second and third flat surfaces each perpendicular to the first flat surface and opposite to each other and a transducer attached to the first flat surface of the piezoelectric crystal base and supplied with a deflection control signal, said acoustooptic element being operative to deflect a light beam passing through the piezoelectric crystal base from the second flat surface to the third flat surface in a deflection plane substantially perpendicular to the first flat surface in response to the deflection control signal,

a first lens element having a first cylindrical surface forming a cylindrical lens and a first slanted flat surface opposite to the first cylindrical surface and disposed so that the first cylindrical surface faces the second flat surface of the piezoelectric crystal base with a curvature thereof extending along a direction substantially perpendicular to said deflection plane such that an optical path for a light beam incident upon the second flat surface of the piezoelectric crystal base passes through the first lens element from the first slanted flat surface to the first cylindrical surface, and

a second lens element having a second cylindrical surface forming a cylindrical lens and a second slanted flat surface opposite to the second cylindrical surface and disposed so that the second cylindrical surface faces the third flat surface of the piezoelectric crystal base with a curvature thereof extending along the direction substantially perpendicular to said deflection plane such that an optical path for a light beam emanating from the third flat surface of the piezoelectric crystal base passes through the second lens element from the second cylindrical surface to the second slanted flat surface.

4,889,416

FINITE DISTANCE ZOOM LENS

Yu Yamada, Kokubunji, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 22, 1987, Ser. No. 76,008

Claims priority, application Japan, Jul. 25, 1986, 61-175074

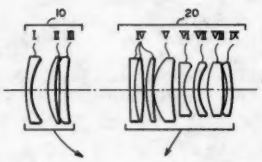
Int. Cl.⁴ G02B *15/14*

U.S. Cl. 350—426 **12 Claims**

1. A zoom lens including:

a negative first group disposed on an enlarging side, said first group consisting of, in succession from the enlarging side, a negative first lens whose reducing side surface has a sharper curvature than the enlarging side surface thereof, a positive second lens whose enlarging side surface has a sharper curvature than the reducing side surface thereof, and a negative third lens; and

a positive second group disposed on the reducing side;



the spacing between said first group and said second group being variable to accomplish a magnification change.

4,889,417

PROJECTION LENS FOR TELEVISION PROJECTOR

Norikazu Arai, Komae, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

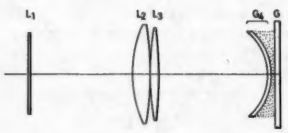
Filed Feb. 25, 1986, Ser. No. 833,342

Claims priority, application Japan, Mar. 1, 1985, 60-38697

The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.

Int. Cl.⁴ G02B *13/18, 1/06*

U.S. Cl. 350—432 **5 Claims**



1. A projection lens for a television projector comprising four units which comprise, arranged from a screen side, a first lens L_1 having a small refracting power, a positive lens L_2 and a third lens L_3 arranged through a large air space from the first lens L_1, and a fourth lens G_4 arranged through a large air space from the second and third lenses L_2 and L_3, the lens L_1 comprising a plastic lens at least one surface of which is aspherical, the lens L_2 comprising a glass lens, the lens L_3 comprising a plastic lens at least one surface of which is aspherical, the lens G_4 of which lens on the side closest to the screen is a plastic lens with a concave surface thereof oriented toward the screen, characterized by being satisfied with the following condition:

$$-0.15<f/f_1<0.1$$

where

f:	combined focal length of the entire system
f_1:	focal length of L_1

4,889,418

ROTATING CYLINDRICAL BEAM SPLITTER

Roland J. Benjamin, Park Ridge, Ill., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 31, 1986, Ser. No. 846,377

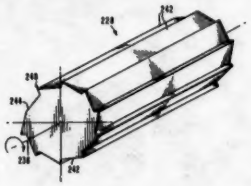
Int. Cl.⁴ G02B *5/136, 26/10*

U.S. Cl. 350—486 **11 Claims**

1. A beam splitter for periodically redirecting a beam of electromagnetic energy from its path comprising:

a cylinder having an axis of rotation and a discontinuous reflective surface which is positioned about the axis and

which comprises at least one reflective portion positionable in the path and at least another portion positionable outside of the path; and



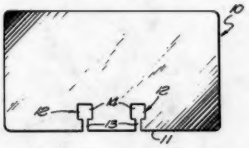
means for rotating said cylinder about its axis for positioning said reflective surfaces respectively in and outside of the beam path, and thereby for enabling respective reflection of the beam from said one surface portion and for bypassing of the beam past said other surface portion.

4,889,419

CARD FILE MIRROR

Dolores N. Kite, 2800 Nielson Way, #705, Santa Monica, Calif. 90405

Filed May 24, 1989, Ser. No. 356,791
Int. Cl.[4] G02B *5/08*
U.S. Cl. 350—600 **7 Claims**



1. An improved mirror comprising:

a substantially rectangular first portion, said first portion having a reflective surface top and bottom edges and first and second side edges;

a second portion coupled to said bottom edge of said first portion, said second portion comprising a means for removably engaging said mirror with the rails of a card index file.

4,889,420

METHOD AND MEANS FOR SECURING GLASSES TO A SUN VISOR

Robert J. Bradshaw, II, 4408 67th St., Des Moines, Iowa 50322, and Robert J. Bradshaw, III, 2230 SE. Caulder Ct., Des Moines, Iowa 50320

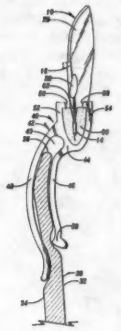
Filed Mar. 6, 1989, Ser. No. 319,269
Int. Cl.[4] G02C *9/00, 7/08*
U.S. Cl. 351—47 **10 Claims**

1. A device for securing glasses to a sun visor, said glasses having a frame comprising a central nose frame and a pair of opposite glass frames extending from opposite sides thereof, said nose frame having a predetermined thickness, said sun visor comprising an elongated flat member having opposite surfaces spaced a predetermined distance from one another and having a perimetric edge extending therearound, said device comprising:

an elongated body member having a central portion, a first pair of spaced apart legs extending in a first direction away from said central portion and a second pair of spaced apart legs extending in a second direction away from said central portion;

said first pair of legs yieldably movable apart from one another and being spaced part a first distance which is less than said predetermined distance between said opposite sides of said elongated flattened member of said sun visor, whereby said first pair of legs may be positioned an opposite sides of said flattened member to yieldably retentively embrace said flattened member therebetween;

said second pair of legs having spaced apart inwardly facing surfaces presented toward one another,



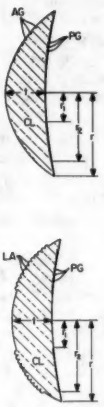
an elastomeric material secured to and covering said facing surfaces of said second pair of legs and forming an approximately V-shaped notch therebetween, said V-shaped notch being sized to receive said nose frame of said glasses whereby said elastomeric material on said facing surfaces of said second pair of legs will yieldably compress toward said facing surfaces and retentively engage and hold said glasses.

4,889,421

CONTACT LENS WITH COSMETIC PATTERN

Allen L. Cohen, 10010 Walsham Ct., Richmond, Va. 23233

Filed Sep. 30, 1988, Ser. No. 252,190
Int. Cl.[4] G02C *7/04*
U.S. Cl. 351—162 **16 Claims**



1. A cosmetic contact lens comprising an optically clear central visual region circumscribed by an area covering at least a portion of the iris, in which such circumscribing area comprises at least two superimposed figures, separated by at least some portion of the contact lens body, with at least the anterior

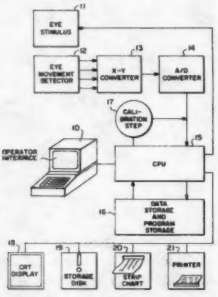
figure having transparent, semi-transparent or open regions, which interact so as to effect a visual appearance, constituting the pattern, representing an apparent illusion of both of them even though the figures have not physically changed.

4,889,422

METHOD AND MEANS FOR DETECTING DYSLEXIA

George Pavlidis, Park La., Apt. 9E, New Brunswick, N.J. 08901

Filed Jan. 28, 1986, Ser. No. 823,464
The portion of the term of this patent subsequent to Jun. 13, 2006, has been disclaimed.
Int. Cl.[4] A61B 3/14
U.S. Cl. 351—210 28 Claims



1. An automated system for determining the existence of dyslexia, said system comprising:

(a) means for stimulating a predetermined pattern of eye movement in a subject to be tested for dyslexia,

(b) means for detecting eye movement in a subject observing said means for stimulating eye movement, said detecting means providing an electrical output signal in response to said movement,

(c) processor means for receiving said electrical output signal, said processor means further including,

(i) means for sampling the output signal to obtain a series of successive eye positions,

(ii) means for converting said successive eye positions into data representing eye movements,

(iii) means for analyzing said data by direction, duration and amplitude in order to differentiate between forward saccadic movements, reverse saccadic movements, pursuit movements and fixations,

(iv) means for comparing the number and placement of reverse saccadic eye movements with predetermined patterns to determine the existence of dyslexia,

(d) output means for enabling display of said diagnosis.

4,889,423

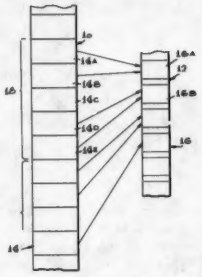
CONVERSION OF HIGH TO LOW FRAME RATE MOTION PICTURE FILMS

Douglas Trumbull, Santa Monica, Calif., assignor to Showscan Film Corporation, Culver City, Calif.

Filed Jun. 26, 1986, Ser. No. 879,037
Int. Cl.[4] G03B 19/18
U.S. Cl. 352—46 7 Claims

1. A method for converting a high rate motion picture strip of film containing a series of frames taken by a camera at a predetermined high frame rate of at least 48 frames per second to a low rate motion picture strip of film useful for projection at 24 frames per second, comprising:

forming at least some of said frames of said low rate film so a first frame thereof includes the overlapping images on a first pair of successive frames of said high rate film, and a next successive frame on said low rate film includes the



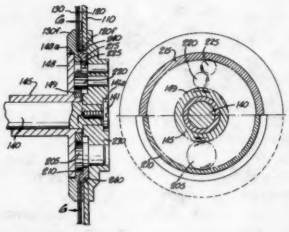
overlapping images of a second pair of successive frames of said high rate film.

4,889,424

MOVIE CAMERA SHUTTER

Albert K. Saiki, Los Angeles, Calif., assignor to Panavision, Inc., Tarzana, Calif.

Filed Dec. 18, 1987, Ser. No. 135,161
Int. Cl.[4] G03B 9/10
U.S. Cl. 352—216 15 Claims



1. A shutter for exposing film in a move camera comprising:

a main shutter wheel rotatably mounted to rotate about a first axis and having at least one radially extending main shutter element forming at least one arcuate aperture between circumferentially successive main shutter elements:

a first adjustable shutter wheel rotatably mounted to rotate about said first axis and being adjacent said main shutter wheel;

a second adjustable shutter wheel rotatably mounted to rotate about said first axis and being adjacent said main shutter wheel and first adjustable shutter wheel, wherein each said adjustable shutter wheel has the same number of radially extending shutter members as the radially extending main shutter elements;

means for pivoting said first and second adjustable shutter wheels relative to said main shutter wheel in opposite angular directions for causing said radially extending shutter members on said adjustable shutter wheels to selectively and progressively extend over each of said arcuate apertures between said main shutter elements;

a drive shaft connected to said man shutter wheel;

a sleeve around said drive shaft and rotating therewith, said sleeve being rotatably adjustable with respect to said drive shaft and having a sun gear thereon;

a first ring gear connected to said first adjustable shutter;

a second ring gear connected to said second adjustable shutter;

a first planet gear engaging said sun gear and said first ring gear;

a second planet gear engaging said sun gear; and

a third planet gear engaging said second planet gear and said second ring gear.

4,889,425

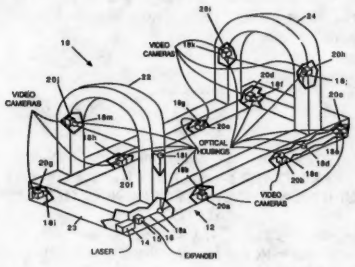
LASER ALIGNMENT SYSTEM

Frank E. Edwards, Everett, and Stephen W. Wilcken, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Nov. 2, 1987, Ser. No. 115,202

Int. Cl.[4] G01B *11/26*; G01C *1/10, 3/00*

U.S. Cl. 356—152 21 Claims



1. An apparatus for monitoring change in shape of a structure comprising:

light source means for generating a light beam, said light source means being rigidly attached to said structure;

photodetecting means rigidly attached to said structure and positioned such that said light beam is directed onto said photodetecting means, said photodetecting means producing data representing a light intensity distribution of said light beam directed onto said photodetecting means; and

means receiving the data for calculating values of parameters of a function modeling beam intensity distribution of the light beam, such that the calculated parameter values optimize a fit with respect to predetermined criteria of the intensity distribution modeled by the function to the intensity distribution represented by the data, wherein at least one of the parameters represents a position of said light beam on said photodetector, and for ascertaining change in shape of the structure by comparing a position of the beam defined by a calculated value of said at least one parameter to a reference position.

4,889,426

MICROSCOPE PHOTOMETER TUBE

Bernd Faltermeier, Aalen, Fed. Rep. of Germany, assignor to Carl-Zeiss-Stiftung, Fed. Rep. of Germany

Filed Oct. 21, 1988, Ser. No. 260,830

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1987, 3735784

Int. Cl.[4] G02B *21/18*; G01N *21/59*

U.S. Cl. 356—432 15 Claims

1. A photometer tube comprising an objective (1), an eyepiece (4), a photoelectric receiver (10), a measurement diaphragm (6) arranged in front of said photoelectric receiver, prism means (3) for dividing a light ray coming from said objective to direct a portion of said ray to said eyepiece and a portion of said ray to said photoelectric receiver, and reflecting means for reflecting an image of said measurement diaphragm back into said eyepiece, said reflecting means compris-

ing a reflecting surface (26, 27, 28, 29, r5) arranged in the path of said ray between said objective and said prism means.

4,889,427

METHOD AND APPARATUS FOR DETECTING LOW CONCENTRATIONS OF (BIO) CHEMICAL COMPONENTS PRESENT IN A TEST MEDIUM USING SURFACE PLASMON RESONANCE

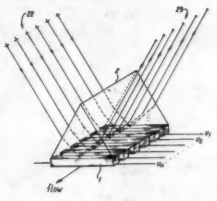
Jacobus J. F. Van Veen, Amsterdam; Johan W. Konig, Noordwijk; Willem M. Ter Kuile, Delft, and Cornelis Van Dijk, Bennekom, all of Netherlands, assignors to Nederlandse Organisatie Voor Toegepastnatuurwetenschappelijk Onderzoek Tno, The Hague, Netherlands

Filed Apr. 11, 1988, Ser. No. 180,156

Claims priority, application Netherlands, Apr. 10, 1987, 8700851

Int. Cl.[4] G01N *21/55*

U.S. Cl. 356—445 12 Claims



1. In a method for detecting low concentrations of at least one chemical component present in a test medium in a test cell, the test cell having a metal layer as sub wall with an external glass prism, using the surface plasmon resonance effect in which a light ray polarized in the plane of incidence is coupled in via the prism and, after attenuated total reflection, is coupled out and the intensity thereof is measured, the incidence angle position of the resonance curve being determined under the influence of change caused in the dielectric constant of the test medium near the metal layer by the chemical component, the improvement comprising providing the metal layer as an array of metal layer strips, each strip being provided with a different selector from a selector array of one type, and simultaneously determining concentrations or concentration changes of one or more components in the test medium through one or more differential measurements caused by a preferential association between each component and such a selector.

4,889,428

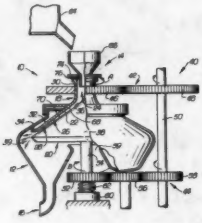
ROTARY MILL

Harry Hodson, Sarasota, Fla., assignor to Concrete Technology Corporation, Santa Barbara, Calif.

Filed Jul. 29, 1985, Ser. No. 760,046

Int. Cl.[4] B28C *5/16;* **B01F** *7/26;* **B02C** *7/08, 7/12*

U.S. Cl. 366—1 **2 Claims**



1. A rotary mill to colloidalize a premixed fluid mortar in a high energy manner so as to increase the degree of hydration comprising a hollow collector casing having a feed inlet to receive the premixed fluid mortar and a discharge outlet for the mixed fluid product, a pair of substantially horizontal parallel counterrotating members cooperatively forming a shear zone therebetween, each of said pair of substantially horizontal parallel counterrotating members including a helical groove formed on the surface thereof extending from substantially the geometric center thereof to the outer edge thereof; said helical grooves of said pair of substantially horizontal parallel counterrotating members being formed in opposite directions relative to each other.

4,889,429

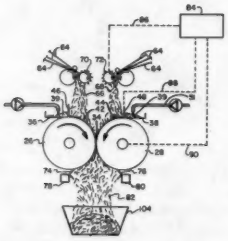
METHOD AND APPARATUS FOR CONTINUOUS PRODUCTION OF IMPREGNATED COMPOUND

Albert Heinzmann, Stegwiessnsrt. 2, 7520 Bruchsal, and Gerhard Rottweiller, Brucknerstr. 2, 7507 Pfinztal, both of Fed. Rep. of Germany

Filed Feb. 9, 1988, Ser. No. 154,062

Int. Cl.[4] B01F *7/12;* **B65B** *3/00, 63/02;* **B29C** *43/00*

U.S. Cl. 366—71 **16 Claims**



7. An apparatus for continuously making a mixture of viscous material with solid material segments cut from rovings comprising:

first and second rotatable members supported in position for rotation in the opposite directions with respect to each other and spaced from each other to define a mixing gap therebetween;

first supply means for continuously coating the viscous material as a layer on said first and second rotatable members, said first supply means including a hopper assembly for each of said rotatable members, each hopper assembly including a discharge opening aligned substantially vertically above the axis of a rotatable member, wall means for receiving and confining a supply of viscous material as a relatively thick globule on the surface of the rotatable member behind the discharge opening, and a coating blade projecting obliquely forward of the opening, for extruding and spreading the viscous material as a relatively thin layer on the surface of the rotatable member in front of the opening;

said viscous layers on said first and second rotatable members adjoining each other and subsequently entering said mixing gap as said first and second rotatable members are rotated in the opposite direction to each other;

second supply means for supplying the solid material segments onto said viscous layer, said solid material after having been supplied onto said viscous layers being dragged into said mixing gap during rotation of said first and second rotatable members to mix with said viscous material as it passes through said mixing gap, thereby forming an impregnated compound; and

means for stripping the impregnated compound from the rotatable members.

4,889,430

PLANETARY GEAR EXTRUDER FOR THE COMPOUNDING AND EXTRUSION OF PLASTIC MATERIALS

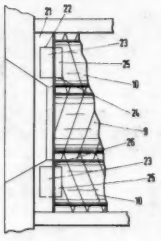
Werner Mueller, Hanover, Fed. Rep. of Germany, assignor to Hermann Berstorff Maschinenbau GmbH, Hanover, Fed. Rep. of Germany

Filed Apr. 18, 1989, Ser. No. 339,664

Claims priority, application Fed. Rep. of Germany, May 4, 1988, 3815061

Int. Cl.[4] B01F *7/08;* **B28C** *1/16*

U.S. Cl. 366—85 **7 Claims**



1. A planetary gear extruder for the compounding and extruding of plastics material, wherein a main spindle is surrounded by and intermeshed with a plurality of planetary spindles which also mesh with gearing formed on the interior surface of the extruder cylinder, comprising:

(a) a stop ring material in said extruder adjacent the discharge end thereof and arranged coaxially to the axis of the main spindle, said stop ring being formed with an annular groove in the surface thereof facing the interior of the extruder and radially aligned with the forward ends of said planetary spindles, and

(b) ceramic body means positioned in said groove in said stop ring, the exposed face of said ceramic body means being flush with said surface of said stop ring for engagement by the forward ends of said planetary spindles,

whereby the frictional wear on both said stop ring and said forward ends of said planetary spindles is reduced.

4,889,431

MIXING KNEADER WITH KNEADING FORKS

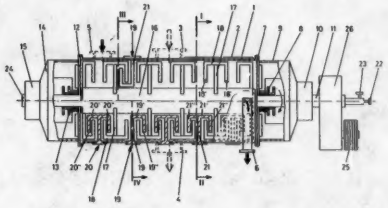
Pierre Liechti, Muttenz, Switzerland, assignor to List AG, Pratteln, Switzerland

Filed Aug. 22, 1988, Ser. No. 234,900

Claims priority, application Switzerland, Aug. 28, 1987, 03322/87

Int. Cl.[4] B01F 7/04

U.S. Cl. 366—99 16 Claims



1. Batchwise or continuously operating mixing kneader for treatment of products, which comprises: a circular-cylindrical housing having housing walls and a longitudinal axis; a kneading shaft mounted in said housing and running coaxial to the housing axis; disk elements mounted on said shaft perpendicular thereto, said disk elements having an outer diameter; co-rotating kneading bars fixed on said outer diameter including arms arranged adjacent said housing walls and at least one radial element fixed to said arms and extending towards the kneading shaft, wherein said disk elements and kneading bars form a plurality of radially co-rotating shearing gaps; and radial carrier arms fixed in the housing wall, support arms carried by said radial carrier arms and running axially along said kneading shaft, and fixed kneading counterelements carried by said support arms and engaging said shearing gaps.

4,889,432

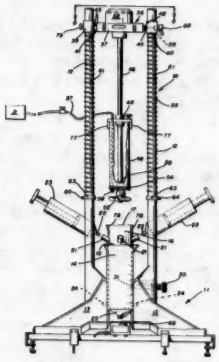
DENTAL MIXER APPARATUS

Roosevelt Patterson, 816 Hillview Heights T-1, Nashville, Tenn. 37204

Filed Feb. 7, 1989, Ser. No. 307,308

Int. Cl.[4] B01F 13/06, 15/02, 7/22; B29B 7/16

U.S. Cl. 366—139 13 Claims



1. An apparatus for mixing dental impression materials, comprising:

(a) a base,

(b) a mixing chamber having an upright longitudinal axis, an upper open end, a bottom end portion, and a substantially uniform cross-section, adapted to receive dental impression materials,

(c) means holding said mixing chamber on said base in a substantially upright position,

(d) an elongated plunger member having a longitudinal axis and a substantially uniform cross-section less than the cross-section of said mixing chamber,

(e) an elongated mixer shaft longer than said plunger member and extending coaxially through said plunger member and having upper and lower end portions,

(f) a mixer head on said lower end portion below said plunger member,

(g) support means on said base supporting said mixer shaft and said plunger member for vertical reciprocal movement coaxially of said mixing chamber between a lower operative position in which said plunger member is telescopingly received in said mixing chamber, and an elevated inoperative position in which said mixer shaft and plunger member are above said mixing chamber,

(h) bearing means supporting said mixer shaft in said plunger member for relative coaxial movement to permit said mixer head to descend from said operative position to a mixing position within said mixing chamber,

(i) a suction conduit for removing air from said mixing chamber while said plunger member is in said operative position, and

(j) drive means for driving said mixer shaft to rotate said mixer head.

4,889,433

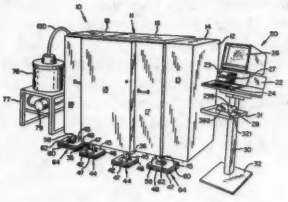
PROGRAMMABLE APPARATUS AND METHOD FOR DELIVERING MICROINGREDIENT FEED ADDITIVES TO ANIMALS BY WEIGHT

William C. Pratt, Canyon, Tex., assignor to Micro Chemical, Inc., Amarillo, Tex.

Division of Ser. No. 137,501, Dec. 22, 1987, Pat. No. 4,815,042, which is a continuation-in-part of Ser. No. 833,904, Feb. 26, 1986, Pat. No. 4,733,971. This application Feb. 16, 1989, Ser. No. 311,336

Int. Cl.[4] B01F 15/04

U.S. Cl. 366—141 3 Claims



1. A method of dispensing and delivering microingredient feed additives into a livestock feed ration shortly before delivering the feed ration to the livestock for consumption, comprising the steps:

storing separately multiple said additives in concentrate form;

dispensing predetermined weights of selected said additive concentrates into a liquid carrier;

intermixing the additive concentrates in the liquid carrier to dilute, disperse, and suspend them and form a liquid carrier-additive slurry;

directing the slurry to a receiving station while maintaining the suspension and dispersion of the additives until delivered into a feed ration; and

determining the predetermined weights of the selected additives by weighing each additive before it enters the carrier,

sensing any motion in the apparatus used to weigh each additive;

stopping the weighing of any additive when motion is sensed that would adversely affect the at least a final weight determination of an additive and resuming the weighing only after the adverse motion has subsided.

4,889,434

APPARATUS FOR DETERMINING CRYSTALLIZATION SOLIDIFICATION CURVES OF CHOCOLATE MASSES AND SIMILAR FATTY MASSES

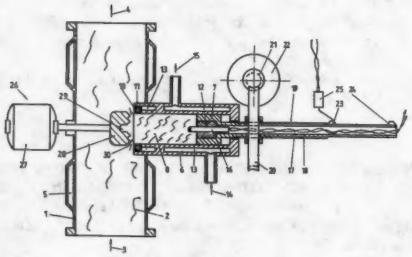
Helmut Sollich, Rabenkirchen, Fed. Rep. of Germany, assignor to Sollich GmbH & Co. KG, Fed. Rep. of Germany

Filed Apr. 8, 1988, Ser. No. 179,578

Claims priority, application Fed. Rep. of Germany, May 6, 1987, 3714951

Int. Cl.[4] G01N *25/00*

U.S. Cl. 374—25 **11 Claims**



1. Apparatus for determining crystallization solidification curves of chocolate masses and similar fatty masses, comprising: measuring means with a chamber formed by a cooled wall; a temperature-measuring sensor projecting into said chamber, liquid chocolate mass being brought to solidification in said chamber, said chocolate mass having a temperature pattern while solidifying; means for recording said temperature pattern as a function of time; piston means and cylinder means in said chamber, said piston means having an end face; said cylinder means having an open end face extending into said chocolate mass; drive means for reciprocating said piston; and mechanical comminuting means for removing a solidified sample of said chocolate mass from said piston and said sensor.

4,889,435

BEARINGS HAVING UPPER AND LOWER HALVES OF DIFFERENT MATERIALS

Roger L. Gojon, Annecy, France, assignor to The Glacier Metal Company Limited, Northwood Hills, England

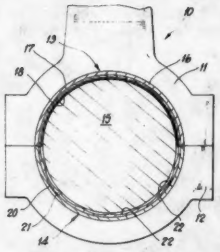
Filed Sep. 6, 1988, Ser. No. 240,709

Claims priority, application United Kingdom, Sep. 5, 1987, 8720915

Int. Cl.[4] F16C *33/02, 33/10*

U.S. Cl. 384—276 **7 Claims**

1. A journal bearing comprising an upper and a lower half-bearing, said upper half-bearing being received in the rod portion of an engine connecting rod and said lower halfbearing being received in the cap portion of said connecting rod so as to receive a shaft journal passing through the bearing wherein said upper half-bearing includes a first bearing material layer having thereon a second, softer overlay bearing material layer, and said lower half-bearing has a running surface of a different material comprising a silicon containing aluminium alloy for effecting a relatively enhanced polishing action on the shaft



journal to reduce the wear rate of said overlay material on said upper half-bearing.

4,889,436

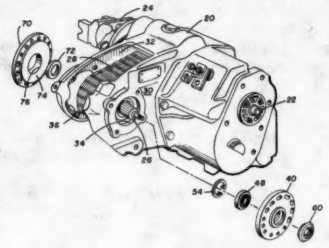
TRANSFER CASE CHAIN ADJUSTMENT

Arthur E. Lynn, Jr., Rte. 7, Box 218A, Andalusia, Ala. 36420

Continuation-in-part of Ser. No. 251,330, Sep. 30, 1988, abandoned, which is a continuation-in-part of Ser. No. 128,615, Dec. 4, 1987, abandoned. This application Mar. 27, 1989, Ser. No. 329,373

Int. Cl.[4] F16C *23/10*

U.S. Cl. 384—447 **13 Claims**



1. For use with a New Process Model 203 transfer case for a four-wheel drive vehicle, said case comprising a principal housing and containing within said principal housing a main drive shaft rotatable about a first axis and a front-wheel transfer shaft rotatable in original forward and rear bearings about an original axis parallel to said first axis and spaced a given original distance therefrom, said transfer case further comprising a first right circularly cylindrical aperture through a planar forward wall of said principal housing, said first aperture being coaxial with said original axis and receiving and supporting said original forward bearing whereby said transfer shaft is supported for rotation about said original axis with the forward end of said transfer shaft extending through said original forward bearing for driving the front wheels of said vehicle, said first aperture being surrounded by four original threaded bolt holes in said forward wall, an assembly for replacing said original forward bearing, said assembly comprising:

(a) a bearing housing having a right circularly cylindrical outer surface mating with said first aperture whereby said bearing housing is journalled in and guided by said first aperture for selective rotation about said original axis to predetermined angular orientations;

(b) said bearing housing having a right circularly cylindrical recess in the plane of said wall and communicating with the interior of said principal housing, said recess having a

new axis parallel to said original axis and spaced therefrom;

(c) a replacement thrust bearing mounted within said recess in said plane of said wall whereby said bearing housing and said replacement bearing are rigidly supported in said plane of said wall and radial forces occurring within said replacement bearing are transmitted entirely in said plane of said wall as compressive forces thorugh said bearing housing to said wall;

(d) said replacement bearing receiving with a press fit and supporting said transfer shaft for rotation about said new axis with said forward end of said transfer shaft extending through said replacement bearing for driving said front wheels;

(e) means for retaining said replacement bearing in said plane of said wall; and

(f) mounting means for securing said bearing housing at selected ones of said predetermined angular orientations whereby the distance from said primary shaft to said transfer shaft may be selectively adjusted.

4,889,437

TICKET ISSUING MACHINES

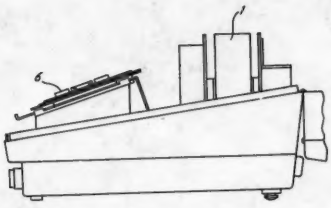
Paul Schofield, Camberley, and Graham P. Sewell, Iver Heath, both of United Kingdom, assignors to Almex Control Systems Limited, Middlesex, England

Continuation of Ser. No. 898,111, Aug. 19, 1986, abandoned. This application Jul. 15, 1988, Ser. No. 219,798

Claims priority, application United Kingdom, Sep. 16, 1985, 8522843

Int. Cl.[4] G07B *15/02*; B41J *3/42*

U.S. Cl. 400—73 **11 Claims**



1. A ticket issuing machine system for a transport undertaking comprising: a ticket issuing machine including a housing having a storage compartment for removably receiving information storage means; a keyboard on the housing for entering into the machine information including details of a ticket to be issued by the machine: a printer within the housing for printing out ticket information on a ticket based upon information entered in the keyboard; removable information storage means for storing accumulative summary information about tickets issued by the machine, the removable information storage means including a storage circuit board module including a memory for storing selected accumulative summary information about tickets issued by the machine, the storage circuit board module being insertable in the storage compartment for receiving issued accumulative summary ticket information from the ticket issuing machine and being removable from the storage compartment; and external storage means separate from the ticket issuing machine and including information transfer means for removably receiving the storage circuit board module for insertion therein and removal therefrom and for receiving accumulative summary information about tickets issued by the machine and stored in the memory of the storage circuit board module, wherein the ticket issuing machine and the storage circuit board module each include respective optical emitting means and optical receiving means to enable accumulative summary information signals about the tickets issued by the machine to be passed between the ticket issuing machine and the storage circuit board module, and wherein the external storage means includes optical emitting means and optical receiving means cooperable with the optical emitting means and optical receiving means cooperable with the optical emitting means and the optical receiving means of the storage circuit board module for transmitting information between the storage circuit board module and the external storage means to permit accumulative summary information relating to the tickets issued by the machine to be transferred from the storage circuit board module to the external storage means.

4,889,438

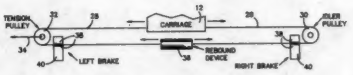
SERIAL PRINTER CARRIAGE DRIVE WITH BALLISTIC REBOUND REVERSAL

John L. Forsyth, Lyndeborough, and John P. Conant, Milford, both of N.H., assignors to Royden C. Sanders, Jr., Wilton, N.H.

Filed Apr. 12, 1989, Ser. No. 336,679

Int. Cl.[4] B41J *19/30*

U.S. Cl. 400—320 **24 Claims**



1. In a system wherein a member is driven in an oscillatory motion between two end points, the improvement for increasing the speed of direction reversal of the member comprising:

(a) ballistic rebound means for transferring energy of a moving member in one direction into a resilient member and for retransmitting energy absorbed by said resilient member back into the moving member in a direction opposite said one direction;

(b) a non-stretching belt; and,

(c) releasable brake means for selectively holding a first end of said ballistic rebound means to prevent movement thereof and for connecting a second end of said ballistic rebound means opposite said first end to the member through said belt at points of reversal of the member adjacent the end points.

4,889,439

AUTOMATIC PAGE END FEATURE FOR AN ELECTRONIC TYPEWRITER

Sherry A. Cook, Lexington; Patrick J. Gerstle, Nicholasville; David R. Smith, and Kathryn R. Stilz, both of Lexington, all of Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 29, 1988, Ser. No. 149,805

Int. Cl.[4] B41J *29/22*

U.S. Cl. 400—706 **4 Claims**

1. An electronic typewriter having an automatic page end control, comprising:

a memory for storing codes representing graphic symbols and functions, and operating parameters for controlling said typewriter;

a print means for printing said symbols on a page;

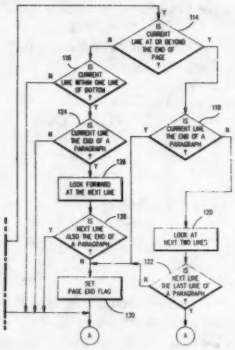
a keyboard for entering keystroke input commands representing control commands for controlling functions and graphic symbol codes;

page support and feed means for supporting and feeding a page of paper;

electronic control means for receiving said control commands and symbol codes from said keyboard, storing said commands and codes in said memory, controlling said print means in accord with said control commands add for retrieving said symbol codes from said memory and using said symbol codes to control said print means to cause printing of said symbols on said page;

said automatic page end control comprising:

operator controllable means to select and store in said memory a page end position for text termination on a page;
means for determining the position of the print line upon which said text is to be printed;
means for determining the relative position of said print line to said page end position as said text is printed;
means for determining the proximity of said print line to the end of a paragraph containing said print line as said text is being printed; and
text terminating means for terminating said text at a position


IS CURRENT LINE AT OR BEYOND THE END OF PAGE ?
IS CURRENT LINE WITHIN ONE LINE OF BOTTOM ?
IS CURRENT LINE THE END OF A PARAGRAPH ?
IS CURRENT LINE THE END OF A PARAGRAPH ?
LOCK FORWARD AT THE NEXT LINE
IS NEXT LINE ALSO THE END OF A PARAGRAPH ?
LOCK AT NEXT TWO LINES
SET PAGE END FLAG
IS NEXT LINE THE LAST LINE OF A PARAGRAPH ?

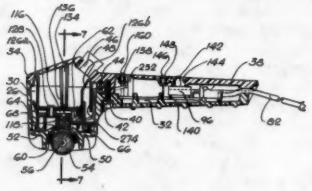
other than said page end position in response to a determination by said means for determining the relative position that said print line occupies one of a plurality of predetermined relative positions to said page end positions and a determination by said means for determining the proximity that said line of text occupies a position within a predetermined distance of the end of a paragraph,
whereby said electronic typewriter will print text while controlling the text termination to prevent printing of a first line or a next to the last line of a paragraph of text as the last line of text on said page.

4,889,440

WAX APPLICATOR WITH ELECTRONIC CONTROL

Charles L. Shano, Phoenix, Ariz., assignor to Lectro Stik Corp., Chicago, Ill.

Continuation of Ser. No. 91,437, Aug. 31, 1987, abandoned. This application Sep. 16, 1988, Ser. No. 245,950
Int. Cl.[4] B05C *17/02*; B42C *9/00*
U.S. Cl. 401—1 **15 Claims**



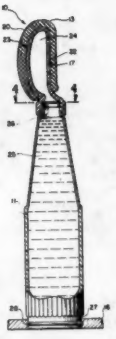
1. A wax applicator for applying molten wax to a desired surface, the applicator comprising
a body including a bowl for receiving wax to be melted and maintained in a molten state,
an applicator roller for receiving the molten wax from the bowl and applying the wax to the desired surface,
the bowl having a lower portion with an opening therein through which the wax flows from the bowl to the roller,
means for rotatably mounting the roller on the lower portion with the roller forming a closure for the opening,
an electrical resistance heating element positioned in the bowl for immersion in the wax and for melting the wax and maintaining the wax in a molten state,
and an electrical circuit for energizing and controlling the heating element,
the circuit including a thermistor positioned in the bowl for immersion in the wax and connected in the circuit directly in series with the heating element for initially supplying full electrical current through the thermistor to the heating element and subsequently partially reducing the electrical current as a thermal response to a high wax temperature sufficient to maintain the wax in a molten state,
the thermistor having a low electrical resistance at room temperatures and making a transition to a disproportionately higher electrical resistance at the high wax temperature for greatly reducing the electrical current supplied through the thermistor to the heating element,
and means for supplying electrical line power to the circuit.

4,889,441

SKIN LOTION DISPENSER AND APPLICATOR

Janell Tice, 21500 Lassen St., Chatsworth, Calif. 91311

Filed Apr. 11, 1988, Ser. No. 180,239
Int. Cl.[4] A45B *34/00*; A46B *11/02*
U.S. Cl. 401—131 **2 Claims**



1. A combination dispenser and applicator for a liquid skin care product comprising:
an elongated hollow handle composed of flexible material having a cylindrical portion supporting a conical, tapered portion;
said cylindrical portion having a thicker cross-section than that of said conical portion;
said handle holding a quantity of liquid skin care product and the sidewalls thereof being thin-walled to permit manual squeezing thereof to expel said skin care product through a dispensing nozzle at the apex end of said conical portion;
a one-way valve carried on said apex end allowing passage of said skin care product externally of said dispenser nozzle in response to said manual squeezing;
an applicator removably carried on one end of said handle about said dispensing nozzle for receiving said skin care product via said one-way valve when said thin-walled handle is squeezed;
said handle having an exterior surface about said cylindrical portion provided with a plurality of parallel ridges constituting frictional, non-slip finger-gripping means;
a base removably carried on the end of said handle opposite

to its end carrying said applicator supporting said handle in an upright at rest or storage position;

said applicator comprising an oval-shaped hollow member having opposite spaced-apart walls joined at their ends by curved sections, a selected one of said walls provided with a plurality of spaced-apart openings extending in a vertical linear line midway between said curved sections for dispensing said skin care product therethrough externally of said handle;

each of said openings being of a different diameter with the largest diameter opening at the top of said line and the smallest diameter at the bottom of said line; and

said openings operable to control the flow through said dispensing applicator member.

4,889,442

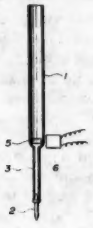
WRITING INSTRUMENT WITH INK QUANTITY OF LEVEL DETECTING FUNCTION

Hiroshi Takagi, Yokohama; Toshiaki Serikawa, Zushi, and Noriaki Tsunoda, Tano, all of Japan, assignors to Mitsubishi Pencil Co., Ltd., Tokyo, Japan

Filed Apr. 1, 1988, Ser. No. 177,469

Int. Cl.[4] B43K *29/00, 7/06*

U.S. Cl. 401—194 **5 Claims**



1. A writing instrument with ink quantity or level detector function comprising;

an ink tube having a ball point tip at one end and containing ink therein,

a float itself formed of a magnetic material and so arranged substantially in contact with the rear end surface of the ink in said ink tube as to be driven in contact with the rear end surface of the ink upon decrease of the ink in said ink tube, and

a magnetic sensor externally provided for detecting the quantity or level of the ink in said ink tube when said float in said ink tube arrives at the tip side thereof upon decrease of the ink in said ink tube.

4,889,443

CONNECTION ARRANGEMENT

David L. Billings, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

Filed Dec. 2, 1988, Ser. No. 278,968

Int. Cl.[4] B25G *3/24, 3/20*; F16B *2/02*; F16D *1/08*

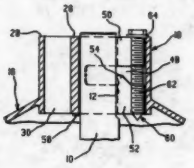
U.S. Cl. 403—365 **13 Claims**

1. A connection arrangement comprising:

a rotatable shaft of generally cylindrical configuration;

a plastic member having an elongated, generally annular bore fitting around said shaft; said bore including a longitudinally extending recess overlapping and projecting generally radially outward of said shaft;

a locking sleeve formed from a strip of metal and fitting within said bore around said shaft; said sleeve having an outwardly projecting bight portion received within said recess; at least said bight portion being split so as to include first and second longitudinally separated portions;



attaching means effective to draw said first and second longitudinally separated portions toward one another for securing said locking sleeve and member to said shaft.

4,889,444

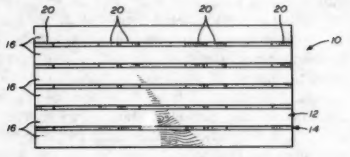
METHOD AND APPARATUS FOR CONSTRUCTION OF ARTIFICIAL ROADS

Joseph E. Pouyer, 13928 Aston, Houston, Tex. 77040

Continuation-in-part of Ser. No. 161,780, Feb. 29, 1988, abandoned. This application May 12, 1988, Ser. No. 195,371

Int. Cl.[4] E01C *5/00*

U.S. Cl. 404—34 **3 Claims**



1. Apparatus for construction of temporary decking and roads for use in areas of poor soil conditions comprising a plurality of substantially identical rectangular units which are placed in two layers, wherein units in different layers are inverted relative to each other, and wherein each unit comprises:

(a) a first rectangular and substantially planar surface;

(b) a second rectangular surface presenting at least four ridges comprising elements arranged transverse to the longitudinal axis of the rectangle, wherein;

(i) first and second transverse elements are each disposed so as to be flush with one of the ends of the unit;

(ii) the remaining transverse elements are approximately twice the width of the first and second transverse elements and wherein said transverse elements are spaced to form at least three similar transverse channels of substantially equal dimensions on the second surface; and,

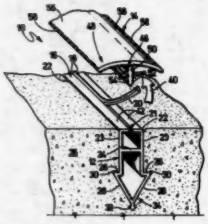
(iii) wherein the first and second transverse ridge elements are approximately half the width of the channels and the remaining transverse elements are approximately the same width as the channels so that transverse elements of any one unit will conform to channels of any other inverted unit, and when units are so interconnected during installation, will substantially prevent longitudinal movement of any unit relative to adjacent units.

4,889,445

EXPANSION JOINT FOR SETTABLE COMPOSITIONS

Larry W. Vittone, 309 Hannah Dr., Oliver Springs, Tenn. 37840

Filed Aug. 12, 1988, Ser. No. 231,729
Int. Cl.[4] E01C *11/10*
U.S. Cl. 404—64 17 Claims



1. An expansion joint for placement in the surface of a plastic composition settable into a hard mass comprising:

an elongate base portion for embedding in the composition while the composition is in its plastic state, said base portion having an upper section including opposite sides extending along the length of said upper section with said sides defining a pair of opposing parts collectively defining an upper surface of said base portion extending along the length of said upper section for positioning adjacent the upper surface of the composition when the base portion is operatively embedded therein, said opposing parts being separably joined to one another along a predetermined path oriented longitudinally of said base portion and extending along said upper surface so that the opposing parts can be separated from one another along said path so as to form a slot in said upper surface between said opposing parts extending generally along said path and along the length of said base portion and for opening to the space above the surface of the composition when said base portion is operatively embedded within the composition, said base portion further including a lower end for placement in the composition below the composition surface and configured to cooperate with the composition in such a manner as to restrict upward displacement of said base portion from the composition once it sets;

an elongate cover portion generally T-shaped in cross section to define a cross bar having lateral end edges and a projection depending from and disposed generally perpendicular to said cross bar, said cross bar defining a pair of cross bar flanged outwardly disposed relative to said projection and terminating in said lateral end edges; and

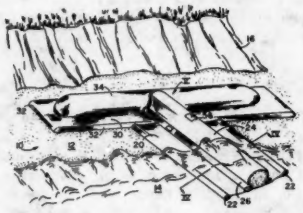
said projection being of such size and shape so as to be received by the slot formed between said opposing parts when said opposing parts are separated from one another and engaged by said opposing parts when said projection is inserted into the slot through said upper surface to secure said cover portion to said base portion and said cross bar flanged being configured to extend out beyond the edges of the composition adjacent said upper surface when the projection is received by the slot, whereby said base portion may be placed into the settable composition with said upper surface disposed adjacent the surface of the composition and, after the composition has set, said opposing parts of said upper surface may be separated from one another to form the slot, and said cover portion may be secured to said base portion by placing said projection into the formed slot so that said projection is engagingly received therein, said cross bar flanges extending out beyond so as to cover the edges of the composition adjacent said upper surface when said cover portion is positioned within the formed slot.

4,889,446

EROSION CONTROL FOUNDATION MAT AND METHOD

Dick L. Holmberg, P.O. Box 100, Whitehall, Mich. 49461

Continuation-in-part of Ser. No. 692,211, Jan. 17, 1985, Pat. No. 4,690,585. This application Dec. 22, 1986, Ser. No. 945,071
The portion of the term of this patent subsequent to Sep. 1, 2004, has been disclaimed.
Int. Cl.[4] E02B *3/04, 3/12*
U.S. Cl. 405—19 52 Claims



47. An erosion control structure adapted to retard shoreline erosion along a body of water, comprising:

an elongated fabric mat having a pair of longitudinal edges and having peripheral pockets extending along said longitudinal edges, said peripheral pockets each having a peripheral pocket cross-sectional area;

stabilizer means separate from said mat and comprising at least one flexible compartment adapted to be filled with ballast material and positioned atop and extending upwardly from said mat;

said stabilizer means having a stabilizer cross-sectional area greater than said peripheral pocket cross-sectional area, whereby said mat is adapted to be laid out such that said mat extends into the body of water with said stabilizer means projecting upwardly from said mat a greater distance than said peripheral pockets.

48. A method of retarding shoreline erosion along a body of water at an erosion region, comprising:

providing an elongated sheet of fabric having longitudinal edges and having side pockets extending along said longitudinal edges, said side pockets having a first diameter;

providing a stabilizer pocket on said mat between said side pockets, said stabilizer pocket having a second diameter greater than said first diameter;

positioning said sheet to extend along the erosion region;

first filling said side pockets;

after filling said side pockets, second filling said stabilizer pocket.

4,889,447

MARINE POLLUTION CONTAINMENT DEVICE

Booth B. Strange, 11106 Wickway, Houston, Tex. 77042

Filed Jul. 31, 1989, Ser. No. 387,521
Int. Cl.[4] E02B *15/04*
U.S. Cl. 405—60 10 Claims

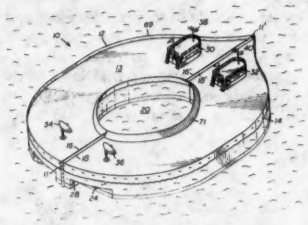
1. A marine pollution containment device, comprising:

a barge, including two substantially semi-circular hulls, each said semi-circular hull including a bulkhead at the opposite extremities thereof;

securing means for fastening said semi-circular hulls together at the bow and stern extremities thereof;

said semi-circular hulls, when fastened together at their extremities, defining an interior well therebetween open to the water, the bottom of each said hull being upwardly

tapered towards said interior well in the manner of an inverted funnel; and



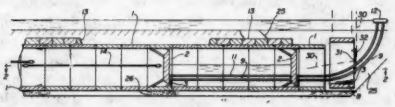
means, including intake pipes, for pumping accumulated water-polluting material from said well for transfer to a pollution-material receiving and transportation means.

4,889,448

TUNNEL CONSTRUCTION

Noel G. Bell, 52 W. Hudson Ave., Englewood, N.J. 07631

Filed Mar. 7, 1989, Ser. No. 319,660
Int. Cl.[4] E21D *10/14*
U.S. Cl. 405—135 **6 Claims**



1. A method of constructing tunnel under water by pre-fabricating short sections of tunnel,

making the length of the sections suitable for fabricating and transporting on land and adapting their ends to make a fluid-tight joints with adjacent sections,

transporting a section to site with its ends open and lowering it into position under water and then transporting and lowering succeeding sections with their ends open and joining them to those previously placed to form sets of a convenient number of sections,

installing a bulkhead in the last section of a set and attaching a pump to the bulkhead to dewater the set,

dewatering the set of tunnel sections and,

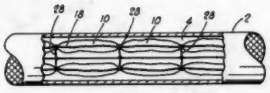
allowing working inside the tunnel, for example tying the sections of tunnel together, grouting joints, placing roadway slabs and installing ventilation and lighting systems, to proceed simultaneously with the placing of sections outside.

4,889,449

SLIPLINER GROUTING METHOD AND SYSTEM

Lindsey D. Lee, Houston, Tex., assignor to Halliburton Company, Duncan, Okla.

Filed Sep. 21, 1988, Ser. No. 247,150
Int. Cl.[4] E02D *29/10*; E21F *15/00*
U.S. Cl. 405—154 **15 Claims**



1. An apparatus for controlling the movement of a slip liner in a sewer prior to and during the grouting of said slip liner in position in said sewer to prevent fluid from leaking through the walls of the said sewer, said sewer and said slip liner having water therein during said grouting of said slip liner in position in said sewer, said apparatus to control said movement of said slip liner in said sewer prior to and during said grouting of said slip liner in position in said sewer by preventing movement of said slip liner with respect to said sewer during said grouting of said slip liner in position in said sewer, said apparatus comprising:

a plurality of inflatable grout bags in the annular space between said slip liner and said sewer for controlling said movement of said slip liner in said sewer prior to and during said grouting of said slip liner in position in said sewer by preventing movement of said slip liner with respect to said sewer during grouting of said slip liner in position in said sewer;

means interconnecting the plurality of inflatable grout bags in the annulus between said slip liner and said sewer, the means interconnecting the plurality of inflatable grout bags comprising:

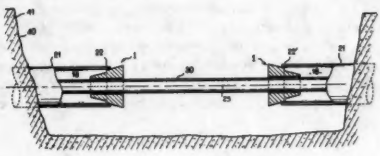
a cable means running along the longitudinal length of each inflatable grout bag of the plurality of grout bags, the cable means being secured to the plurality of grout bags and to the grout bag protectors.

4,889,450

GUIDANCE AND PROTECTION SYSTEM FOR THE LAYING OF PIPES

Roland Anne, Caen, France, assignor to Gaz de France, Paris, France

Filed Oct. 20, 1987, Ser. No. 110,393
Int. Cl.[4] F16L *1/00*
U.S. Cl. 405—154 **6 Claims**



1. Apparatus for guiding and protecting the laying of piping comprising a sleeve formed by at least two truncated cones and having a passageway which traverses the central part of and extends essentially axially within said sleeve, wherein the sleeve comprises two half-casings joined along a junction plane oriented essentially in the axis of said sleeve and is formed so that the larger base of a first cone has a diameter smaller than the smaller base of a second cone, said truncated cones being placed end to end and forming a single piece, such that said larger base of the first truncated cone is connected to said smaller base of the second truncated cone.

4,889,451

DRIVEN PILE WITH TRANSVERSE BROADENING IN SITU

Johan H. Simanjuntak, Jalan Tanah Abang II/23, Jakarta, Indonesia

Continuation of Ser. No. 934,620, Nov. 24, 1986, Pat. No. 4,733,994, which is a continuation of Ser. No. 698,103, Feb. 4, 1985, abandoned. This application Oct. 27, 1987, Ser. No. 114,115
The portion of the term of this patent subsequent to Mar. 29, 2005, has been disclaimed.
Int. Cl.[4] E02D *5/74*
U.S. Cl. 405—244 **6 Claims**

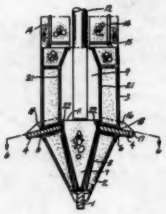
1. An elongated pile assembly for supporting a structure after the pile assembly is driven into a soil stratum, the assembly comprising:

an elongated pile body having upper and lower ends, a hollow interior and an exterior surface;

a slot extending through the pile body from the hollow interior to the exterior surface of the pile body, said slot comprising an exterior opening having upper and lower edges at the exterior surface of the pile body;

a plate having inner and outer ends positioned within the slot, said plate being moveable from a retracted position wherein the plate does not protrude from the pile body and an extended position wherein the outer end of the plate protrudes from the pile body;

means for moving the plate from its retracted position to its extended position after the pile assembly has been driven into a soil stratum; and



at least one deformable retainer bar fixedly attached to the exterior surface of the pile body at a position below the slot, said retainer bar extending upwardly across the exterior opening of the slot to thereby retain the plate within the slot during driving of the pile assembly into a soil stratum, and wherein said retainer bar is deformed when the plate moves from its retracted position to its extended position and wherein in its deformed state, said retainer bar, exerts an upward pressure on the plate to maintain the plate against the upper edge of the exterior opening of the slot and thereby aid in preventing further downward settling of the pile assembly once the plate has been extended.

4,889,452

VENTED PRODUCT PUMP AND AIR FILTER ARRANGEMENT

Robert D. Heyl, Williamsport, Pa., assignor to The Young Industries, Inc., Muncy, Pa.

Continuation of Ser. No. 150,454, Jan. 29, 1988, abandoned, which is a continuation of Ser. No. 881,249, Jul. 2, 1986, abandoned, which is a division of Ser. No. 775,241, Sep. 12, 1985, abandoned, which is a continuation-in-part of Ser. No. 727,071, Apr. 25, 1985, abandoned. This application Feb. 28, 1989, Ser. No. 318,434

Int. Cl.[4] B65G *53/66, 53/46, 53/60*

U.S. Cl. 406—85 **8 Claims**

1. An apparatus for conveying comminuted materials comprising:

a hopper having an inlet through which material to be conveyed may be deposited,

a filter operable for inducing a flow of air across said hopper inlet to prevent airborne particles of material deposited in said hopper from escaping into the atmosphere,

a pump defining a chamber for receiving material from said hopper,

a valve for controlling the supply of said material from said hoppr to said pump chamber,

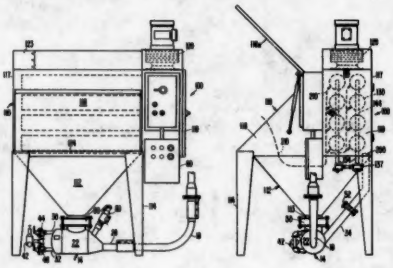
means for injecting fluid under pressure into said pump chamber to flush material disposed therein through a pump outlet,

a valve for controlling the supply of fluid to said pump chamber,

means intercommunicating said pump chamber and said hopper adjacent an inlet of said filter for venting said pump chamber to said hopper,

a valve for controlling the flow of fluid through said venting means, and

control means operable to sequentially close said fluid supply valve while opening said material supply valve for supplying a batch of material from said hopper to said pump chamber, close said material supply valve and said vent valve while opening said fluid supply valve for flushing said batch of material out of said pump chamber



through said pump outlet, and then open said vent valve after closing said fluid supply valve and maintaining said material supply valve closed for venting said pump chamber to said hopper whereby the pressure in said pump chamber is reduced to facilitate the gravity flow of material from said hopper to said pump chamber when said material supply valve is reopened during the next cycle of operation, and material entrained in the fluid vented from said pump chamber will be conveyed to said hopper and be subjected to the action of said filter.

4,889,453

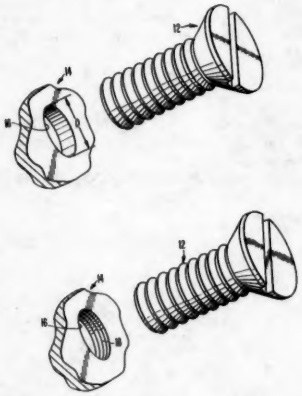
METHOD OF FORMING A TAPPED HOLE

Robert D. Micco, Schnecksville, and Howard M. Williams, Jr., Emmaus, both of Pa., assignors to Hubbell Incorporated, Orange, Conn.

Filed Feb. 28, 1989, Ser. No. 316,954

Int. Cl.[4] B23G *1/16;* **B23B** *35/00*

U.S. Cl. 408—1 R **6 Claims**



1. A method of forming a tapped hole in a metallic material

by threading a standard threaded fastener of the Unified Thread Standard type into a hole, comprising the steps of

selecting a standard threaded fastener of the Unified Thread Standard type for tapping the hole having a predetermined pitch p, basic major diameter D_o, and

selecting a metallic material having a predetermined hardness less than the hardness of the fastener and a predetermined thickness for receiving the tapped hole therein;

determining the diameter D of the hole to be formed in the metallic material by using the formula

$$D = D_o - x\left(\frac{17\sqrt{3}}{24}\right)p$$

where

x a variable percentage of thread engagement between the threaded fastener and the threaded hole in the material and ranges from about 0.2 to about 0.6,

D=hole diameter (inches),

D_o=basic major diameter (inches),

p=pitch of thread (inches);

forming the hole with diameter D as determined by the formula; and tapping the hole by threading the fastener therein.

4,889,454

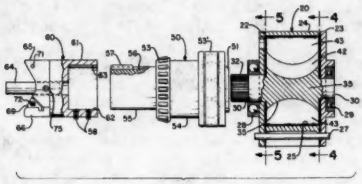
PORTABLE POWER TOOL FOR MILLING TUBE ENDS

Tollief O. Hillestad, 108 9th Ave., West, Summerland Key, Fla. 33042, and Mark W. Hillestad, 220 Hatch Rd., Wadsworth, Ohio 44281

Filed Oct. 7, 1988, Ser. No. 254,958

Int. Cl.[4] B23B *47/08*

U.S. Cl. 408—124 **19 Claims**



1. A portable, gas-operated rotary tool for milling a surface on an end of a tubular workpiece having a longitudinal axis, comprising:

a rotary gas-operated motor having a central axis of rotation defined by a motor output shaft, said output shaft being splined to a spindle assembly;

means for supplying gas under pressure to said rotary motor;

a rotary milling head being keyed to said spindle assembly so as to be operatively connected to said rotary motor in axial alignment therewith and being directly driven thereby about said central axis, said milling head able to turn at a speed of at least 2500 rpm;

guide means connected to and extending forwardly from said milling head for relative insertion in said tubular workpiece; and

means for gripping said tool whereby an operator may position said milling head with said central axis in alignment with said longitudinal axis of said workpiece so that rotation of said milling head mills a surface on the respective end of said tubular workpiece.

4,889,455

DRILL

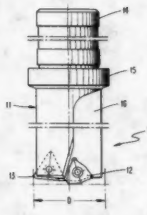
Kurt O. Karlsson, Sandviken, and Leif E. Karlsson, Karlholmsbruk, both of Sweden, assignors to Sandvik AB, Sandviken, Sweden

Filed May 18, 1988, Ser. No. 195,609

Claims priority, application Sweden, May 21, 1987, 8702106

Int. Cl.[4] B23B *51/02*

U.S. Cl. 408—188 **13 Claims**



1. A drill for stack drilling comprising a drill body having a drill diameter and provided with chip flutes, a first cutting insert releasably secured to a first insert site of said drill body, and a second cutting insert releasably secured to a second insert site of said drill body, said first and second inserts disposed mainly on opposite sides of a rotary axis of said drill body adjacent a forward end thereof, said first insert arranged at least partly radially inside of said second insert, said first insert having a first active cutting edge which includes first, second, and third cutting edge portions, said first cutting edge portion being disposed radially closer to said axis than said second and third cutting edge portions, said third cutting edge portion disposed radially farther from said axis than said first and second cutting edge portions, said second cutting edge portion interconnecting said first and third cutting edge portions and forming therewith inner and outer obtuse angles, respectively, said first cutting edge portion being shorter than each of said second and third cutting edge portions, a bisector of said outer obtuse angle being rearwardly convergent with respect to said axis and forming an acute angle therewith as said drill is viewed in a direction perpendicular to said axis, said second insert having a substantially straight second active cutting edge, a first imaginary extension of said second cutting edge portion of said first insert intersecting said axis at a first point as said drill is viewed in said direction, a second imaginary extension of said second cutting edge intersecting said axis at a second point as said drill is viewed in said direction, said first and second imaginary extensions forming substantially equal angles with said axis as said drill is viewed in said direction, said second point being spaced rearwardly with respect to a forwardmost end of said first cutting edge portion.

4,889,456

DRILLING TOOL FOR DRILLING IN SOLID METAL MATERIAL, IN PARTICULAR FOR DRILLING IN PLATE STACKS

Bernd Killinger, Freiberg, Fed. Rep. of Germany, assignor to Komet Stahlhalter- und Werkzeugfabrik Robert Breuning GmbH, Fed. Rep. of Germany

Filed Jan. 19, 1989, Ser. No. 300,275

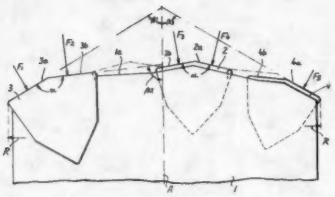
Claims priority, application Fed. Rep. of Germany, Jan. 27, 1988, 8800929

Int. Cl.[4] B23B *51/02*

U.S. Cl. 408—224 **7 Claims**

1. In a drilling tool for drilling in solid metal material, in particular for drilling in plate stacks, said drilling tool having a shank and first and second reversible carbide tips with similar shapes, which carbide tips are arranged at different radial distances at the end of said shank and offset from each other by

180° in the circumferential direction about an axis of rotation of said drilling tool, whose working ranges overlap, and each of which comprises radially inner and outer working cutting edges of equal length, of which respectively two adjacent inner and outer working cutting edges on the same carbide tip form an obtuse angle to each other, wherein said first reversible carbide tip is located radially closer to said axis of rotation than said second reversible carbide tip, wherein said inner working cutting edge of said first reversible carbide tip extends radially slightly beyond said axis of rotation, and said inner working cutting edge of said second reversible carbide tip is axially set back from said outer working cutting edge of said



first reversible carbide tip, and said inner and outer working cutting edges of said second reversible carbide tip form acute angles of different size with said axis of rotation, the improvement wherein said first reversible carbide tip is smaller than said second reversible carbide tip , and wherein on the same radius as said first reversible carbide tip there is arranged a third reversible carbide tip which is also smaller than said second reversible carbide tip, said third reversible carbide tip having a radially outer working cutting edge oriented approximately on the same working cone and on the same maximum radius as said radially outer cutting edge of said second reversible carbide tip.

4,889,457

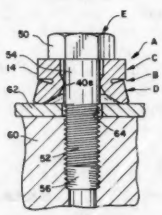
LOAD INDICATOR

David C. Hageman, Bainbridge, Ohio, assignor to Premier Industrial Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 179,965, Apr. 11, 1988, abandoned. This application May 16, 1988, Ser. No. 194,302

Int. Cl.[4] F16B *31/12*

U.S. Cl. 411—10 **17 Claims**



1. A load indicator comprising a body member having opposite ends with end surface areas, a longitudinal axis and an outer surface extending between said opposite ends, an unthreaded hole through said body member opening outwardly at said opposite ends, a circumferential groove in said outer surface intermediate said ends, said groove extending completely around said outer surface, said groove having a bottom and opposite sides, said body member having a deformable web defined between said groove bottom and said hole, one said end of said body member having a recessed surface therein surrounding said hole such that the surface area of said one end is spaced outwardly from said axis further than the surface area of the other said end, each said end surface area lying in a plane extending substantially perpendicular to said longitudinal axis in both collapsed and uncollapsed conditions, each said end surface area extending completely around and being symmetrical about said longitudinal axis, and said surface area of said one end being not less than approximately 10% of said surface area of said other end in both collapsed and uncollapsed conditions, whereby a predetermined compressive force applied to said body member generally parallel to said axis causes collapse of said groove to provide a visual indication that the predetermined compressive force has been reached and also causes inward bulging of said web so that in the collapsed condition said recessed surface remains out of a plane extending substantially perpendicular to said longitudinal axis.

4,889,458

LOCK NUT ASSEMBLIES

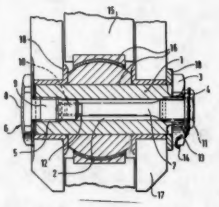
Brian W. Taylor, Preston, United Kingdom, assignor to British Aerospace, PLC, London, United Kingdom

Filed Sep. 16, 1988, Ser. No. 245,633

Claims priority, application United Kingdom, Sep. 18, 1987, 8722021

Int. Cl.[4] F16B *35/00, 35/02*

U.S. Cl. 411—383 **6 Claims**



1. A lock nut assembly comprising a sleeve bolt, a clamp bolt and a locking bolt, in which the sleeve bolt has a hollow shank with an internally threaded portion at one end and a head portion having an axial bore extending through it at its opposite end, a portion of said opposite end being internally threaded,

the clamp bolt also having a hollow shank, said hollow shank including one end with a first, externally threaded, portion and a second, internally threaded portion, and a head portion at its opposite end,

and the locking bolt has an externally threaded portion at one end and a head portion at its opposite end,

wherein the first portion of the shank of the clamp bolt and the internally threaded portion of the shank of the sleeve bolt are dimensioned for co-operation with threads of one hand, and the second portion of the shank of the clamp bolt and the externally threaded portion of the locking bolt are dimensioned for co-operation with threads of opposite hand,

whereby in use the clamp bolt may be screwed into the sleeve bolt the locking bolt may be screwed into the clamp bolt via the hollow shank of the sleeve bolt and, because of the opposite handedness of the respective co-operating threads, the assembly will resist any tendency to undo.

4,889,459

FURTHER IMPROVED OVERHEAD SHEET-INSTALLATION SUPPORT TOOL

Paul C. Anderson, 143 Maple Ave., Chester, N.J. 07930

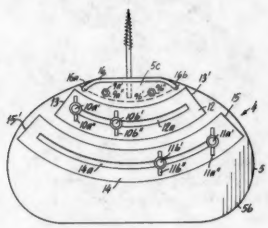
Continuation-in-part of Ser. No. 209,924, Jun. 22, 1988, abandoned. This application Aug. 9, 1988, Ser. No. 230,039

Int. Cl.[4] F16B *23/00, 35/06*

U.S. Cl. 411—400 **19 Claims**

1. An overhead sheet-installation support tool comprising in

combination: a forwardly-directed tapered threaded screw having a longitudinal axis along its length-dimension and having a forwardly-located screw distal end and a rearwardly-engaged proximal end, the screw being tapered toward and at its forwardly-located screw distal end and said distal end having male screw threads; a handle structure extending rearwardly from said rearwardly-enlarged proximal end, said handle structure having at least one rearwardly-extending flattened lateral surface with the flattened lateral surface extending in a plane parallel with and substantially aligned with the longitudinal axis of the screw such that the handle structure provides free-space in juxtaposition thereto for moving past the flattened lateral surface an end of a rigid sheet-structure toward a forward mounting position for a rigid sheet-structure; and shoulder-forming structure forming at least one forwardly-positioned shoulder structure rigidly continuous with at least one of said screw and said handle structure, the one shoulder structure extending laterally to said longitudinal axis of the screw and said one forwardly-positioned shoulder structure laterally extending along a second longitudinal axis thereof substantially parallel to and aligned with said flattened lateral surface such that the one flattened lateral surface is positioned to provide free-space in juxtaposition thereto for moving past said one forwardly-positions shoulder structure toward a forward mounting position for a rigid sheet-structure; the one forwardly-positioned shoulder structure and the handle structure jointly extending rearwardly sufficiently to be graspable



and to allow forceful manual finger-twisting thereof to screw said screw into a beam or rafter; and a plurality of separate manually adjustable at-least first and second support members each of said plurality having at least one member-flat face mounted with the member-flat face parallel to and secured against said flattened lateral surface, said first support member having a first distal end and said second support member having a second distal end, and said first and second support members each being intermittently adjustable and intermittently immovably secureable in different positions and positioned in a mounted state such that said first and second distal ends respectively thereof are movable forwardly of said one forwardly-positioned shoulder structure toward and to be braceable against structure above said one forwardly-positioned shoulder structure when adjusted forwardly, in which said handle structure has spaced apart rearwardly-extending edges, and in which said manually adjustable first support member is mounted at a first position positioned away from said screw in juxtaposition to one of said spaced-apart rearwardly-extending edges such that in an extended state said first distal end thereof is spaced-away from said screw, the second support member being mounted at a second position such that in an extended state said second distal end thereof is in juxtaposition to said screw and spaced away from the spaced-apart rearwardly-extending edges, and the first and second support members being mounted such that in an upwardly extended state the first and second distal ends being located on opposite-sides of the screw from one another.

4,889,460

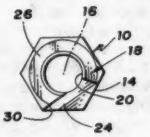
THREAD CLEANING NUT

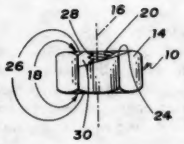
Curtis L. Laidlaw, 7229 Shaw Rd., and Bradley J. Brewer, 520 Blacks's Corners, both of Imlay City, Mich. 48444

Filed Jul. 21, 1988, Ser. No. 222,561

Int. Cl.[4] F16B *33/06*

U.S. Cl. 411—437 **18 Claims**





1. A thread cleaning nut for cleaning the thread of a bolt or the like, the nut comprising:

a nut body having a central axis;

first and second spaced apart faces formed on the nut body;

a central aperture extending through the nut body along the central axis between the first and second faces; and

a screw thread formed between the first and second faces within the central aperture, wherein less than one-half of the first face is shaped as a first flat surface and more than one-half of the first face is shaped as a second flat surface inclined at an acute angle to the first flat surface, and wherein an end portion of the screw thread between the first and second surfaces is exposed to define at least one cutting tooth for cutting a path for the screw thread wherein the first and second surfaces intersect a third flat surface, the third flat surface intersecting the first flat surface at an edge inclined with respect to the second flat surface, the third flat surface intersecting the central aperture in a plane spaced from the central axis and intersecting the end portion of the screw thread at an acute angle to define an acutely angled cutting edge of the at least one cutting tooth, the cutting edge cleaning the thread of the bolt during one of a threading operation and an unthreading operating.

4,889,461

WRAPPING APPARATUS FOR A BOOK COVER PRODUCTION MACHINE

Jan-Dieter Kampen, Lubbecke, and Karl-Friedrich Schroder, Rahden, both of Fed. Rep. of Germany, assignors to Kolbus GmbH & Co. KG, Rahden, Fed. Rep. of Germany

Filed Jul. 7, 1988, Ser. No. 216,663

Claims priority, application Fed. Rep. of Germany, Jul. 10, 1987, 3722877

Int. Cl.[4] B42C *11/04, 7/00*; B31F *1/00*

U.S. Cl. 412—19 **20 Claims**

1. In a wrapping machine for use in the production of book covers, the covers being formed from cover units having a two-sided flat cover board with an overlay material in contact with a first side thereof, the overlay material extending beyond edges of the cover board, the cover units being transported overlay side down in a plane in a first direction on a conveyer system during the production of the book covers, improved apparatus for forming the overly material about the edges of

the cover board which are lending and trailing in the direction of cover unit movement comprising:

at least first cooperating movable wrapping means for the leading and trailing edges of the cover units, said wrapping means being spacially displaced and each comprising:

a wrapping rail which extends transversely with respect to the direction of cover unit movement;

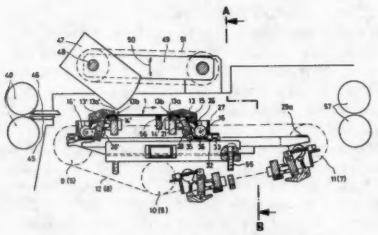
first mounting means for pivotally supporting said wrapping rail, said first mounting means being movable relative to the conveyor system transport plane;

a support rail which extends transversely with respect to the direction of cover unit movement; and

second mounting means for supporting said support rail said second mounting means being movable relative to the conveyor system transport plane to position said support rail for cooperation with said wrapping rail to defined a moving cover unit edge clamp;

drive means for said wrapping means, said drive means being coupled to said wrapping means and defining an endless path for said mounting means, said drive means being adjustable whereby the separation between said leading and trailing wrapping means may be varies;

first control means for imparting movements to said leading wrapping means as it travels under the influence of said drive means, said first control means imparting movement to said first mounting means to cause said first mounting means to move toward said conveyor system transport plane to thereby cause said leading edge wrapping rail to



engage and deflect upwardly overlay material extending beyond the leading edge of the moving cover board, said first control means subsequently causing said first mounting means to move said leading edge wrapping rail in a direction which is counter to the direction of motion of the cover unit to thereby fold the overlay material around the leading edge of the cover board and clamp the folded overlay material and cover board between the wrapping and support rails of said wrapping means;

second control means for imparting movements to said trailing edge wrapping means as it travels under the influence said drive means, said second control means causing said second mounting means to move toward said conveyor system transport plane to thereby cause said trailing edge wrapping means to engage and deflect upwardly overly material extending beyond the trailing edge of the cover board, said second control means thereafter causing said second mounting mans to move said trailing edge wrapping rail in the direction of cover unit movement at a speed in excess of the speed of movement of the cover unit to thereby fold the overly material about the trailing edge of the cover board and clamp the folded overlay material between the wrapping and support rails of the trailing edge wrapping means;

means for sequentially energizing said first and second control means whereby said second control means is not energized until after the cover unit is clamped by said leading edge wrapping means;

hold-down means or retaining the overlay material in the folded over position during continued movement of the cover unit; and

means for sequentially returning said movable wrapping rails of said leading and trailing edge wrapping means to their initial positions whereby the cover units are released from the apparatus.

4,889,462

LOADING APPARATUS FOR EMPTYING CONTAINERS INTO A COMMON RECEPTACLE

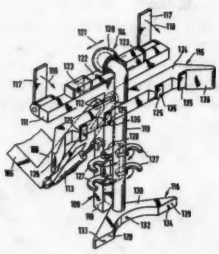
Jakob Naab, Mainz-Laubenheim, and Arno Gajewski, Münster-Sarmsheim, both of Fed. Rep. of Germany, assignors to Zoller-Kipper GmbH, Mainz/Laubenheim, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 767,308, Aug. 19, 1985, Pat. No. 4,722,658. This application Dec. 30, 1987, Ser. No. 139,416

Claims priority, application Fed. Rep. of Germany, Aug. 21, 1984, 3430643; Jul. 27, 1985, 3527022

Int. Cl.[4] B65F *3/04*

U.S. Cl. 414—408 **27 Claims**



1. A container-dumping apparatus for the emptying of a container into a collecting receptacle, especially for the dumping of refuse bins into a refuse-collecting truck, said apparatus comprising:

a container tilting frame adapted to be approached to a container to be dumped and having a tilting axis about which said frame can be tilted;

gripper means on said frame engageable with said container for enabling entrainment of the container with the frame;

bracing means on said frame adapted to bear against said container when said container is engaged by said gripper means to take up at least part of the weight of said container;

connecting means on said frame joining said gripper means and said bracing means into a transport unit adapted to retain and support said container;

an entraining device for coupling said transport unit with said tilting frame while permitting limited mobility of said transport unit relative to said tilting frame;

position-restoring and alignment means between said unit and said tilting frame and effective upon lifting of said tilting frame, said unit and the container carried thereby for shifting said unit into a predetermined normal starting position relative to said frame for dumping of said container upon a displacement of said unit from said predetermined normal starting position into an off-normal position as permitted by said entraining device upon engagement of said gripper means with said container; and

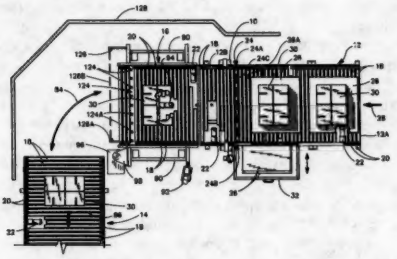
arresting means on said frame actuatable for locking said unit in said normal position upon displacement of said unit into said normal position by said position-restoring and alignment means as said tilting frame is lifted for dumping of said container and for releasing said unit upon lowering of said tilting frame for the limited mobility of said unit relative to the frame permitted by said entraining device.

4,889,463

SLIP SHEET REMOVAL APPARATUS

Terry Frost, Rockford, Wash.; Terry B. Smith, Coeur D'Alene, Id., and Charles D. Vensel, Spokane, Wash., assignors to ASC Machine Tools, Inc., Spokane, Wash.

Filed Apr. 12, 1988, Ser. No. 180,846
Int. Cl.[4] B65G *65/40*
U.S. Cl. 414—416 17 Claims



1. A slip sheet removal apparatus for removal of a dunnage sheet from beneath a paperboard blank stack conveyed on a conveyor assembly, the slip sheet removal apparatus comprising:

dunnage sheet removal means for engaging a leading edge of the dunnage sheet and for moving the dunnage sheet to beneath the conveyor assembly as the paperboard blank stack is conveyed along the conveyor assembly, a portion of the dunnage sheet removal means having an up position and a down position, in the up position the portion of the dunnage sheet removal means extending above the top of the conveyor assembly so as to engage the leading edge of the dunnage sheet, in the down position the portion of the dunnage sheet removal means being retracted so as to permit the paperboard blank stack to be conveyed along the conveyor assembly past the dunnage sheet removal means;

actuator means for selectively raising and lowering the portion of the dunnage sheet removal means between the up and down position; and

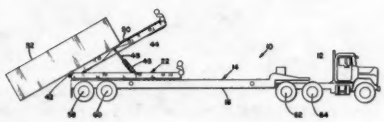
sensing means for sensing the arrival of the paperboard blank stack at a predetermined position upstream to the dunnage sheet removal means and signalling the actuator means to selectively move the portion of the dunnage sheet removal means between the up and down position.

4,889,464

MOVABLE TIPPING FRAME FOR HOIST TRUCKS

F. Wayne Self, North Little Rock, Ark., assignor to Translift Systems, Inc., Conway, Ark.

Filed Oct. 25, 1988, Ser. No. 262,323
Int. Cl.[4] B60P *1/04*
U.S. Cl. 414—491 7 Claims



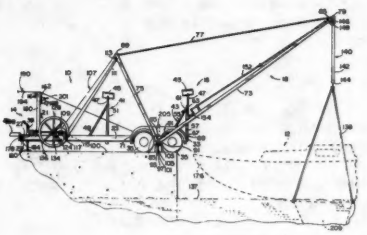
1. A hoist vehicle having an elongated bed including a front end and a rear end with axle-mounted wheels, said bed comprising laterally spaced apart side rails interconnected together by longitudinally spaced apart cross members, track means disposed on said cross members extending longitudinally in said bed at laterally spaced dispositions, a slide frame including laterally spaced apart longitudinally extending beam members interconnected together by longitudinally spaced apart cross beams, roller means journally carried at the lateral extremities of said cross beams for rotatably riding on said track means for permitting movement of said slide frame between longitudinal dispositions, a tipping frame pivotably mounted on said slide frame adjacent the rear end thereof, lift means for pivotably raising and lowering said tipping frame relative to said slide frame selectively between a position wherein said tipping frame is supported on said slide frame and inclined positions relative to said slide frame, load moving means on said tipping frame for securely moving a container along said tipping frame for loading and unloading thereof when said tipping frame for loading and unloading thereof when said tipping frame is inclined, a pair of longitudinally spaced apart sprockets rotatably carried in said bed for rotation about laterally extending axes, an endless chain trained about said sprockets so as to have upper and lower longitudinally extending runs, bracket means fastened to said chain and to at least one of said cross beams, and drive means for driving said chain and thereby said slide frame longitudinally selectively to position said tipping frame and container at selective positions relative to said bed in order to optimize the load over the axles.

4,889,465

SELF-LOADING SAILBOAT TRAILER

Richard E. Brooks, Rte. 1, Box 263, Chassell, Mich. 49916

Filed Jun. 27, 1987, Ser. No. 212,294
Int. Cl.[4] B63C *13/00*; B60P *1/48, 3/10*; B66C *13/02*
U.S. Cl. 414—546 29 Claims



1. A trailer for loading, unloading and transporting a fixed keel boat comprising:

a frame having support means for supporting a fixed keel boat, said support means including a keel support tray, wheels mounted on said frame for permitting transport of the boat supported on said frame, and means for coupling said frame to a vehicle;

a boom including a pair of arm structures, each structure pivotally coupled to a side of the frame and means for coupling the boat to said arm structures, said arm structures each including a main boom member;

pivot means on said frame and defining a pivot for pivoting said arm structure to said frame and for permitting said boom to be moved from said pivot for transport; and

winch means connected to said boom for pivoting said boom about said pivot means during the loading and unloading of the boat.

4,889,466

CONTROL DEVICE FOR A POWER SHOVEL

Hideo Jindai, Hirakata; Keiji Bando, Kyoto; Masakazu Yoshida, Kyoto, and Hideki Yamada, Kyoto, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

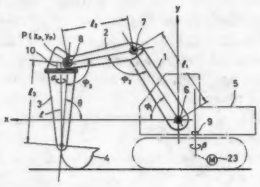
PCT No. PCT/JP86/00394, § 371 Date Mar. 18, 1987, § 102(e) Date Mar. 18, 1987, PCT Pub. No. WO87/00567, PCT Pub. Date Jan. 29, 1987

PCT Filed Jul. 25, 1986, Ser. No. 44,942

Claims priority, application Japan, Jul. 26, 1985, 60-165294; Jul. 26, 1985, 60-165295; Aug. 2, 1985, 60-170848

Int. Cl.[4] E02F *3/32*

U.S. Cl. 414—694 **7 Claims**



1. A control device for use in a power shovel having an upper revolving superstructure, a first boom having a base end pivotably connected to said upper revolving superstructure, and a fore end, a second boom having a base end pivotably connected to said fore end of the first boom, and a fore end and an arm comprising a base portion pivotably connected said fore end of the second boom, and a rotatable portion rotatable around the longitudinal axis thereof, comprising:

angle detecting means for detecting the respective posture angles of said first boom with respect to a horizontal plane, said second boom with respect to said first boom and said arm with respect to said second boom;

posture angle calculating means for calculating a posture angle of said arm with respect to said horizontal plane based on output of said angle detecting means;

reference angle setting means for setting a reference posture angle of said arm with respect to said horizontal plane; and

arm cylinder control means for controlling an arm cylinder so as to bring the posture angle of said arm to said reference posture angle.

4,889,467

TOOLING ASSEMBLY FOR ROD MATERIAL

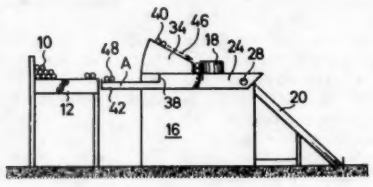
Helmut Zahlaus, Kriftel, Fed. Rep. of Germany, assignor to Heinz RUHL, D-Ochsenfurt, Fed. Rep. of Germany

Filed Dec. 22, 1987, Ser. No. 136,807

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1986, 3644482

Int. Cl.[4] B65G *47/52*

U.S. Cl. 414—746.2 **4 Claims**



1. A tooling assembly of tooling a rod material and transporting the material in a transport direction from a material stock to a tool, and from over the tool to a place of deposit for the tooled material, the tooling assembly being characterized by the following features:

(a) arms pivotably moved as a unit extend rigidly from a shaft, and the swivel axis of the arms extends perpendicularly to the transport direction and is located between the tool and the place of deposit,

(b) between the material stock and the tool, a ramp-shaped element inclined toward the tool is arranged, on which the rod material can be placed by means of the arms,

(c) the angle of inclination of the ramp-shaped element is larger than the angle of friction of the rod material to enable the automatic gliding of the rod material therealong,

(d) the arms, each pivotable on one side of the tool, each have a step located in a section thereof which becomes situated above the ramp-shaped element when the arms are pivoted upwardly with respect to the tool from a lowered position to a lifted position, whereby, when the arms are pivoted at their lifted position, rod material held on the arms between the material stock and the tool is guided by the arms to the steps to be stopped thereby above the ramp-shaped element and material held in the tool is lifted from the tool and guided by the arms to the place of deposit and, when the arms are pivoted to their lowered position, the material stopped by the steps is provided to the ramp-shaped element and is guided thereby to the tool.

4,889,468

SUBMERGED TYPE PUMP

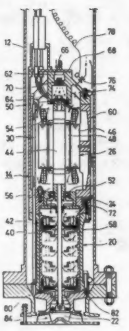
Kazuo Ishikura, Tokyo, Japan, assignor to Nikkiso Co., Ltd., Tokyo, Japan

Filed Dec. 27, 1988, Ser. No. 291,451

Claims priority, application Japan, Dec. 28, 1987, 62-330138

Int. Cl.[4] F04D *27/00*

U.S. Cl. 415—146 **2 Claims**



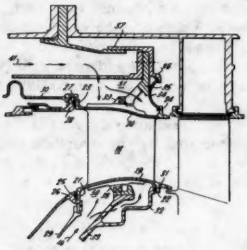
1. A submerged type pump which is vertically seated on a seating face arranged on a bottom of a fluid lifting column and is comprised of a motor section and a pump section with a casing in which a handling fluid passes, characterized in that a check valve is arranged at a pump discharged port and an automatic switch valve is arranged on the top of a casing so that said automatic switch valve is released by closing said fluid lifting column with the pump seating face and the check valve to discharge the handling fluid suspended in said fluid lifting column.

4,889,469

A NOZZLE GUIDE VANE STRUCTURE FOR A GAS TURBINE ENGINE

Wilfred H. Wilkinson, Turnditch, United Kingdom, assignor to Rolls-Royce (1971) Limited, London, England

Continuation of Ser. No. 688,097, May 24, 1976, abandoned.
This application Jul. 28, 1978, Ser. No. 929,557
Int. Cl.[4] F03B 3/18
U.S. Cl. 415—191 6 Claims



1. A nozzle guide vane structure for a gas turbine engine comprising an aerofoil portion having integral inner and outer platform members, each platform member having a gas contacting surface which defines part of the boundary of the annulus of hot gas which passes, in operation, through the vane structure and a nongas contacting surface from which extends a forward and a rearward sealing flange, the flanges being adjacent the forward and rearward edges respectively on the platform, sealing means including at least one resilient sealing device between adjacent structure of the engine and the flanges, said sealing means providing a space between each forward and rearward flange sealed against ingress of the hot gases, and mounting means for the vane structure including dogs extending from the aerofoil portion through each platform and projecting from the nongas contacting surface of each platform intermediate the forward and rearward flanges off the same and into the sealed space, said dogs being connected in each sealed space to adjacent fixed mounting structure of the engine so as to support the vane structure against axial and radial movement and so as to transfer all gas loads on said aerofoil portion of the vane structure directly to the adjacent fixed mounting structure of the engine without the loads going through the flanges of said platforms whereby said flanges and said platforms are of a relatively light weight construction.

4,889,470

COMPRESSOR DIAPHRAGM ASSEMBLY

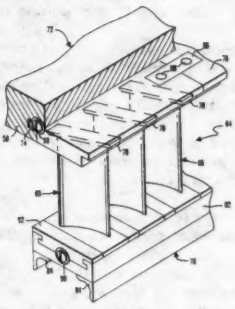
Augustine J. Scalzo, Longwood, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 1, 1988, Ser. No. 226,705
Int. Cl.[4] F04D 29/54
U.S. Cl. 415—209.2 30 Claims

1. In a combustion turbine having a casing, one or more slots of a first predetermined cross-section formed circumferentially within the casing at a compressor portion of the turbine, and a compressor diaphragm assembly adapted to be suspended from each of the one or more slots to provide a labyrinth seal with a plurality of compressor discs, a method of forming each compressor diaphragm assembly comprising the steps of:

providing a plurality of vane airfoils each of which have an inner shroud formed integrally with said vane airfoil, and an outer portion attached to said vane airfoil;

providing outer ring means for suspending each of the plurality of vane airfoils at a stagger angle, said outer ring means having an upper portion of complementary cross-section to the first predetermined cross-section so as to slidably engage the slots in the turbine casing, and a lower portion with a plurality of parallel slots of a second predetermined cross-section each of which are disposed to suspend said outer portion of a respective one of said plurality of vane airfoils at said stagger angle;



suspending said plurality of vane airfoils from said outer ring means, thereby disposing each said vane airfoil and its respective outer portion at said stagger angle; and

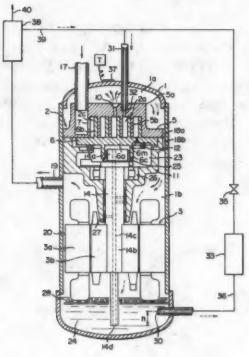
providing seal carrier means for engagement with each said inner shroud, said seal carrier means having removably attached thereto at least one pair of disc-engaging seals.

4,889,471

MECHANISM FOR PREVENTION OF BURNING OF BEARING PORTIONS IN A HERMETIC TYPE SCROLL COMPRESSOR

Yasushi Izunaga; Hiroaki Kuno, and Shintaro Sado, all of Shimizu, Japan, assignors to Hatachi, Ltd., Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 216,654
Claims priority, application Japan, Jul. 10, 1987, 62-170978
Int. Cl.[4] F04B 49/02; F04C 18/04
U.S. Cl. 417—32 5 Claims



1. A hermetic type scroll compressor comprising a hermetic casing;

a scroll compressor section;

an electric motor section;

a crank shaft rotatably supported by a frame means and disposed along a vertical axis of said scroll compressor, said scroll compressor section and said electric motor section being coupled to each other by said crank shaft;

an oil suction bore means extending through said crank shaft

for supplying oil to bearing means of the compressor section of the scroll compressor;

an oil suction pipe means connected at a first end thereof to a bottom end of said crank shaft for axially extending said oil suction bore means, said oil suction pipe means having a second end opening into the oil stored in an oil storage portion provided at a bottom portion of said hermetic casing;

an oil extraction pipe means opening at a first end into the oil stored in said oil storage portion so as to allow extraction of said oil from said oil storage portion and supplying the extracted oil through an oil cooler means and throttling means to an oil injection pipe means for injecting the extracted oil into one of a suction chamber means or a compression chamber means of the compressor section at a midpoint of a compression stroke of the scroll type compressor;

the hermetic type scroll compressor compresses a gas in said scroll compressor section, discharges said gas into said hermetic casing to effect separation of the oil contained in said gas in said hermetic casing, discharges said gas from said hermetic casing after separation while storing separated oil in said oil storage portion; wherein said second end of said oil suction pipe means is located near the bottom of said oil storage portion, said first end of said oil extraction pipe means is positioned higher than the position of said second end of said oil suction pipe means in said oil storage portion so that as a level of the oil in the oil storage portion falls below the first end of the oil extraction pipe means the supply of oil to the oil injection pipe means is interrupted whereby a temperature of the compressed discharged gas increases due to the decrease in the amount of oil injected by the oil injection pipe means; and

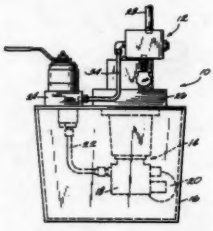
wherein a thermostat means is provided on a portion of an outside wall means for defining a space of said hermetic casing into which said gas is discharged for sensing the increase in temperature of said discharged gas to cause said hermetic type scroll compressor to be stopped upon the temperature reaching a predetermined level due to the decrease in the amount of oil injected by the injector pipe means into one of a suction chamber means of said scroll compressor or a compression chamber means of said scroll compressor section.

4,889,472

AIR SPEED CONTROL VALVE AIR PRESSURE DRIVE HYDRAULIC FLUID PUMP

Arnold F. Decker, and Timothy L. Silke, both of Aurora, Ill., assignors to Templeton, Kenly & Co., Broadview, Ill.

Filed Apr. 25, 1988, Ser. No. 185,521
Int. Cl.[4] F04B *17/00*
U.S. Cl. 417—46 **13 Claims**



1. An air driven hydraulic fluid pump comprising;

a hydraulic fluid reservoir;

a hydraulic fluid pump operably connected to the hydraulic fluid reservoir to pump hydraulic fluid from the hydraulic fluid reservoir and adapted to deliver the hydraulic fluid under pressure through a discharge port to a hydraulic fluid cylinder, the hydraulic fluid pump including a movable driven member;

an air pressure operated motor operably connected to the movable driven member to drive the movable driven member, and the air pressure operated motor being adapted to be connected to a source of air pressure; and

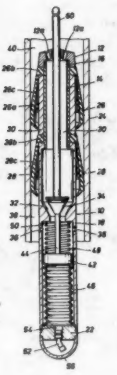
an airflow control valve between the source of air pressure and the air pressure operated motor for controlling the amount of air pressure supplied to the air pressure operated motor, the airflow control valve including a valve body having an air pressure inlet port, an air pressure outlet port, a valve bore between the air pressure inlet port and the air pressure outlet port, a valve member housed in the valve bore and movable between an airflow restricting position and an open position, means for causing movement of the valve member toward the open position in response to an increase in the hydraulic fluid pressure generated by the hydraulic fluid pump at the discharge port, and means for resiliently biasing the movable valve member toward the flow restricting position.

4,889,473

PRODUCTION PLUNGER

W. E. "Wes" Krueger, Anderson, Tex., assignor to E-Z Lift Pump, Inc., College Station, Tex.

Filed Jan. 23, 1989, Ser. No. 299,130
Int. Cl.[4] F04B *47/12*
U.S. Cl. 417—56 **6 Claims**



1. A production plunger for reciprocating in the production string of wells that produce both liquid and gas to assist the gas in lifting produced liquid to the surface comprising a body for reciprocating in the production string of a well, said body having a passageway extending longitudinally through the body, and means closing the lower end of the passageway, seal means carried by the body for engaging the inner wall of the production string to prevent fluid flowing upwardly in the production string from passing between the body and the inner wall of the production string, a valve seat in the passageway, a valve member located in the passageway in the body above the valve seat, a valve rod connected to the valve member and extending downwardly through the valve seat, a piston connected to the valve rod below the valve seat, means containing air under pressure below the piston exerting an upward force on the piston urging the valve member away from the valve seat, an opening in the body below the valve seat through which liquid produced by the well can flow into the passageway in the body and upwardly through the valve seat until the liquid accumulated above the piston is sufficient to compress the air below the piston and close the valve thereby allowing

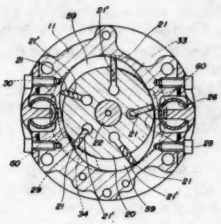
the gas pressure below the plunger to move the plunger and the liquid above the plunger to the surface.

4,889,474

AIR CONDITIONING SYSTEM WITH VARIABLE CAPACITY COMPRESSOR

Nobuyuki Nakajima; Kenichi Inomata; Masaya Moruta; Toshio Yamaguchi, and Kazuo Eitai, all of Konan, Japan, assignors to Diesel kiki Co., Ltd., Tokyo, Japan

Filed Oct. 28, 1988, Ser. No. 263,826
Claims priority, application Japan, Feb. 5, 1988, 63-15045[U]
Int. Cl.[4] F04B *49/08*
U.S. Cl. 417—295 **13 Claims**



1. In an air conditioning system including an evaporator having an outlet and a variable capacity compressor, said compressor having a higher pressure zone, a lower pressure zone including a suction chamber connected to said outlet of said evaporator, pressure-responsive means which is displaceable in response to pressure representative of a thermal load on the system, pressure control means responsive to displacement of said pressure-responsive means for bringing said higher pressure zone into and out of communication with said lower pressure zone to thereby control the difference between pressure from said higher pressure zone and pressure from said lower pressure zone, and means responsive to a change in the difference between pressure from said higher pressure zone and pressure from said lower pressure zone for varying the delivery quantity of said compressor,

the improvement comprising:

a gastight chamber formed within said compressor and accommodating said pressure-responsive means; and

a capillary tube connected between said gastight chamber and said outlet of said evaporator for introducing pressure at said outlet of said evaporator as said pressure representative of a thermal load on the system into said gastight chamber;

wherein said pressure control means brings said higher pressure zone into and out of communication with said lower pressure zone in response to displacement of said pressure-responsive means responsive to a change in the pressure at said outlet of said evaporator.

4,889,475

TWIN ROTARY COMPRESSOR WITH SUCTION ACCUMULATOR

Edwin L. Gannaway, Adrian, and Arturo L. Ortiz, Tecumseh, both of Mich., assignors to Tecumseh Products Company, Tecumseh, Mich.

Filed Dec. 24, 1987, Ser. No. 138,558
Int. Cl.[4] F04B *23/04*
U.S. Cl. 417—350 **14 Claims**

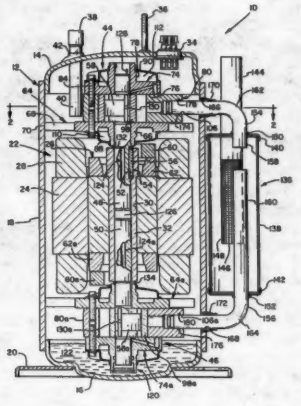
1. A hermetic compressor assembly, comprising:

a housing;

drive means disposed within said housing for providing a pair of synchronous axially opposed rotary outputs, said drive means comprising a rotatable rotor;

a pair of positive displacement compressors, each having a rotary input comprising a rotatable crankshaft;

coupling means for coupling both said crankshafts to said rotor, including a quill coaxially disposed within said rotor to receive and drivingly engage said crankshafts therein; and



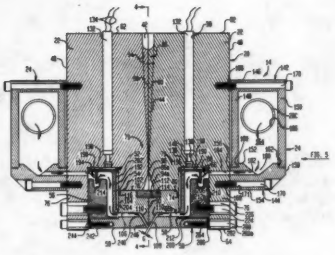
stop means associated with each of said crankshafts for limiting the axial penetration of a respective crankshaft into a respective end of said quill, said stop means comprising abutment means on each of said crankshafts for abutting a respective end of said quill.

4,889,476

MELT BLOWING DIE AND AIR MANIFOLD FRAME ASSEMBLY FOR MANUFACTURE OF CARBON FIBERS

Peter G. Buehning, Short Hills, N.J., assignor to Accurate Products Co., N.J.

PCT No. PCT/US86/00041, § 371 Date Nov. 5, 1987, § 102(e) Date Nov. 5, 1987, PCT Pub. No. WO87/04195, PCT Pub. Date Jul. 16, 1987
PCT Filed Jan. 10, 1986, Ser. No. 130,359
Int. Cl.[4] B29C *47/12*
U.S. Cl. 425—72.2 **3 Claims**



1. A melt blowing die assembly comprising

(a) a die body having (i) a triangular die tip having oblique side walls which intersect at an apex and a plurality of parallel orifices formed in the apex; (ii) flow passages for conducting melt material to the orifices; (iii) means defining first and second air passages for conducting air from the exterior of the die body to both sides of the die tip, each air passage including an elongate groove extending parallel to the apex of the die tip, a plurality of parallel

flow distribution holes having inlets for receiving air into the die body and outlets discharging into the groove, and an elongate passage from the groove to the die tip for conducting a sheet of air to one side of the apex of the die tip; and (iv) an air deflector assembly mounted in each groove and having baffle means defining a tortuous passage for receiving air from the outlets of the die body air distribution holes to intermix air discharging therefrom, the air deflector assembly including an outer flock which in part defines the tortuous path, the block being secured to the die body by a first set of bolts and being adjustably movable in a direction parallel to the die tip orifices;

(b) means defining first and second air chambers for conducting air to the first and second air passages, respectively, each air chamber having a plurality of parallel air flow distribution holes formed in a wall portion thereof, the flow distribution holes being aligned with the flow distribution holes of one of the air passages of the die body; and

(c) a pair of coplanar air plates positioned on one side of the die body and extending outwardly on opposite sides of the die tip and defining therewith an outlet for the air passages on opposite sides of the die tip apex, each air plate being mounted on one of the outer blocks of the deflector assembly by a second set of bolts and being moveable with its block in a direction parallel to the die tip orifices, the air plates being adjustably movable in a direction perpendicular to the direction of the die tip orifices, whereby each air plate is adjustable in both parallel and perpendicular directions with respect to the die tip orifices by loosening the first and second set of bolts, locating each air plate in both the parallel and perpendicular positions and tightening the first and second set of bolts, the adjustment being made without disassemblage of the air plates from the body.

4,889,477
EXTRUDER HEAD

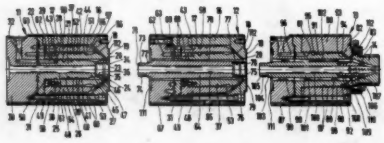
Johannes Wortberg, Bochum; Paul B. Junk, Neunkirchen, and Harry Franke, Bochum, all of Fed. Rep. of Germany, assignors to Battenfeld Fischer Blasformtechnik GmbH, Lohmar, Fed. Rep. of Germany

Continuation of Ser. No. 907,490, Sep. 15, 1986, abandoned. This application Mar. 23, 1989, Ser. No. 330,934

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1985, 3532996

Int. Cl.[4] B29C *47/06, 47/20*

U.S. Cl. 425—133.1 **12 Claims**



1. An extruder head for the extrusion of tubular preforms having single-layer or multiple-layer walls, from plastics material melt which has been plasticized in extruders, the extruder head having an axis and a front end, comprising a plurality of head parts each capable of being used individually as a complete and operational unit or arranged one behind the other in any desired combination in axial direction of the extruder head and having a central annular duct extending in the axial direction, each annular duct defined by an outer surface of a sleeve and by an inner surface of a casing of the head part, each head part defining an inner cylindrical duct, a nozzle pin extending through the inner cylindrical duct of the extruder head, a discharge nozzle connected to the nozzle pin at the front end of the extruder head, each sleeve having first and second ends and each casing having first and second ends, engagement elements mounted on each first and second end of each sleeve and each first and second end of each casing, the engagement elements on the first ends of the sleeves being constructed so as to complement the engagement elements on the second ends of the sleeves and the engagement elements on the first ends of the casings being constructed so as to complement the engagement elements on the second ends of the casings, the discharge nozzle having engagement elements coupleable to the engagement elements on the ends of the sleeves and casing of the head part adjacent to the discharge nozzle, and the engagement elements on the second ends of the sleeve and the casing of one head part being coupleable to the engagement element on the first ends of the sleeves and casing of the next adjacent head part, the engagement elements acting to connect the sleeves and casings to one another in such a way that the central annular ducts of the head parts are in axial alignment, wherein each head part defines at least one spirally extending distributor means spaced radially from the central annular duct for effecting spiral flow of the melt through the head parts, and wherein each head part has an annular gap formed downstream of the distributor means for permitting flow of the plasticized plastics material from the distributor means to the central annular duct, whereby a desired single-layer or multiple-layer wall composition of the preforms is obtained by axially aligning one or more of the head parts and connecting the complementing engagement elements of head parts arranged immediately next to each other.

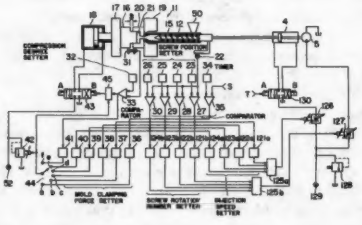
4,889,478
APPARATUS FOR OPERATING AN INJECTION COMPRESSION MOLDING MACHINE

Kazuhito Sato, Gotenba, Japan, assignor to Toshiba Kikai K. K., Tokyo, Japan

Division of Ser. No. 140,145, Dec. 29, 1987, Pat. No. 4,855,095. This application Feb. 15, 1989, Ser. No. 311,104

Int. Cl.[4] B29C *45/80*

U.S. Cl. 425—149 **6 Claims**



1. In apparatus for operating an injection compression molding machine comprising a stationary metal mold, a movable metal mold, an oil pressure actuator for advancing said movable metal mold toward said stationary metal mold to form a mold cavity therebetween with a predetermined compression clearance δ left between said movable and stationary metal molds, a heating cylinder engaging said stationary metal mold, means for supplying a thermoplastic resin into said heating cylinder, a screw contained in said heating cylinder for injecting molten resin into said mold cavity, means for rotating said screw, and means for reciprocating said screw in said heating cylinder, the improvement comprising:

a screw position detector for detecting an axial position of said screw;

a plurality of screw position setters respectively setting predetermined screw positions along which said screw is moved;

a plurality of comparators respectively comparing outputs of said screw position setters with an output signal of said screw position detector;

a plurality of mold clamping force setters connected to receive output signals of said respective comparators;

a transfer switch for selecting one of outputs of said mold clamping force setters; and

an electromagnetic transfer valve energized by an output of said transfer switch through a control device for actuating said oil pressure actuator.

4,889,479

CHANGING DEVICE FOR CHANGING THE PLASTIC MATERIAL TO BE SUPPLIED TO A HORIZONTAL INJECTING UNIT OF AN INJECTION MOLDING MACHINE

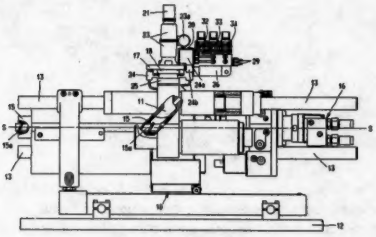
Karl Hehl, Arthur-Hehl-Str. 32, D-7298 Loßburg 1, Fed. Rep. of Germany

Filed Mar. 30, 1989, Ser. No. 330,491

Claims priority, application Fed. Rep. of Germany, Mar. 30, 1988, 3810732

Int. Cl.⁴ B29C *45/07*

U.S. Cl. 425—185 **9 Claims**



1. In a changing device for supplying an injecting unit of an injection molding machine with a plastic material selected from a plurality of such plastic materials, such injecting unit comprises a plasticizing cylinder defining a horizontal injection axis and having a rear end and a carrier block in which said rear end of said plasticizing cylinder is mounted and which has a supply passage which communicates with the interior of said plasticizing cylinder,

said changing device comprising

a guide bar having a through bore and adapted to be mounted on said carrier block so that said guide bar is at right angles to said injection axis and said through bore registers with said supply passage,

a traversing plate, which is movably mounted on and parallel to said guide bar and has a plurality of port bores, which are aligned along said guide bar and spaced equal distances apart along said guide bar and include two end bores and at least one intermediate bore, wherein said traversing plate is movable along said guide bar to a plurality of feed positions, in which respective ones of said port bores register with said through bore,

a traversing drive for moving said traversing plate to each of said feed positions,

a plurality of gates, which extend between said traversing plate and said guide bar and each of which is associated with and individually operable to open and close one of said port bores, and

means for connecting a feed hose to each of said port bores for a supply of one of said plastic materials to said port bore,

the improvement residing in that

said traversing drive comprises a plurality of piston-cylinder units, which extend along said guide bar and are mechanically connected in series and comprise each two relatively extensible and retractable members, said piston-cylinder units comprising primary and final units at opposite ends of said plurality of units,

one of said two members of said primary unit is adapted to be axially held in position,

the other of said two members of said primary unit is connected to another of said piston-cylinder units,

one of said two members of said final unit is secured to said traversing plate,

the other of said two members of said final unit is connected to another of said piston-cylinder units, and

said piston-cylinder units have equal stroke lengths, which are so related to the spacing of said port bores that said through bore will register with one of said end bores when all said piston-cylinder units are extended, said through bore will register with the other of said end bores when all said piston-cylinder units are retracted, and said through bore will register with an intermediate one of said port bores when at least one of said piston-cylinder units is extended and at least one of said piston-cylinder units is retracted.

4,889,480

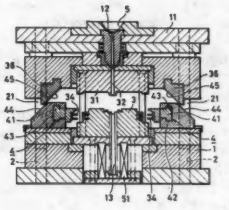
SLIDE CORE MOLD AND INJECTION MOLDING

Susumu Nakamura, and Koichi Yokoi, both of Yamanashi, Japan, assignors to Sankyo Engineering Co., Ltd., Yamanashi, Japan

Filed Dec. 2, 1988, Ser. No. 278,855

Int. Cl.⁴ B29C *45/44*

U.S. Cl. 425—577 **4 Claims**



1. A slide core mold comprising: a core mold locking frame **(1)**; a core mold **(3)** fixed to said core mold locking frame; a cavity mold locking frame **(11)** mounted for movement toward and away from said core mold locking frame; a cavity mold **(31)** fixed to said cavity mold locking frame and engageable with said core mold to define a cavity **(33)** having an undercut space **(35)** near an edge of said cavity; injection means connected to said cavity and core mold locking frames for injecting material to be molded into said cavity; a first slider block **(42)** having a front surface facing said core mold and a back surface opposite from said front surface, said first slider block being slidably mounted to said core mold locking frame for movement toward and away from said core mold, said back surface including a pressure receiving inclined surface **(44)** facing said cavity mold locking frame; an undercut core **(4)** connected to said first slider block at said front surface thereof, said undercut core having a portion for insertion into said undercut space when said first slider block slides toward said core mold; a first block body **(36)** connected to said cavity mold locking frame and including a pressing inclined surface **(45)** engageable with said pressure receiving inclined surface of said first slider block when said cavity and core mold locking frames are moved toward each other, for moving said first slider block toward said core mold; said first slider block including guide grooves **(6)** therein on opposite sides of said pressure receiving inclined surface and at said back surface of said first slider block; and said first block body including guide projections **(61)** on opposite sides of said pressing inclined surface for sliding engagement in respective guide grooves **(6)** of said first slider block, said guide projections and guide grooves being inclined so that with movement together and

apart of said cavity and core mold locking frames, said first slider block slides toward and away from said core mold.

4,889,481

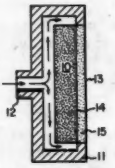
DUAL STRUCTURE INFRARED SURFACE COMBUSTION BURNER

Jeffrey R. Morris, Scio, and Nicholas H. Burlingame, Belmont, both of N.Y., assignors to Hi-Tech Ceramics, Inc., Alfred Station, N.Y.

Continuation-in-part of Ser. No. 232,718, Aug. 16, 1988, abandoned. This application Aug. 28, 1989, Ser. No. 399,179

Int. Cl.[4] F23D *14/12*

U.S. Cl. 431—328 **32 Claims**



1. In a surface combustion radiant heat burner comprising an inlet plenum for receiving fuel and oxidant gas mixtures from at least one supply inlet and a burner body secured in communication with the inlet plenum, said burner body having an inlet side facing the plenum and an outlet side defining a radiating surface, the improvement comprising,

said burner body comprising a first layer of porous ceramic material adjacent the inlet side and a second layer of porous ceramic material adjacent the outlet side defining said radiating surface,

said first layer of porous ceramic material having a thickness of at least about 0.01 inch and a fine interconnected porous structure with a mean pore diameter ranging from 0.00004 inch to 0.10 inch,

said second layer of porous ceramic material having a thickness of at least about 0.05 inch and a coarse interconnected porous structure with a mean diameter ranging from 0.05 to 0.40 inch, and

at least the outer surfaces of said first porous layer and substantially all surfaces of said second porous layer being provided with a fully dense ceramic coating.

4,889,482

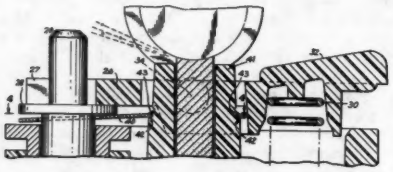
VALVE ACTUATOR FOR POCKET LIGHTER

Friedrich Schächter, Draschestrasse 31, Vienna, Austria A-1232

Continuation of Ser. No. 50,161, May 14, 1987, Pat. No. 4,773,849. This application Aug. 15, 1988, Ser. No. 231,935

Int. Cl.[4] F23Q *1/02*

U.S. Cl. 431—344 **32 Claims**



1. A fuel burning lighter comprising:

a supply of liquified gaseous fuel;

burner means communicating with said fuel supply;

valve means positioned between said fuel supply and said burner means;

means to provide first force to retain said valve means in a closed position to prevent gaseous fuel from passing therethrough;

means to provide second force less than said first force biasing said valve means toward an open position; and

means to offset the first force providing means by thumb force of the user of the lighter so as to allow said second force providing means to move said valve means to the open position; wherein removal of the thumb force of the user allows said first force providing means to move said offset means and return said valve means to the closed position.

4,889,483

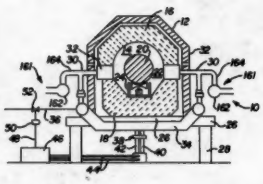
TEMPERATURE CONTROLLED PROBE ASSEMBLY

Charles B. Gentry, Belmont, Mich., assignor to Granco-Clark, Inc., Belding, Mich.

Filed Sep. 6, 1984, Ser. No. 647,931

Int. Cl.[4] F27D *19/00*; F23N *1/00*

U.S. Cl. 432—49 **17 Claims**



1. In a furnace for heating articles to an elevated set point temperature and comprising a heating chamber through which the articles are moved, combustion means for generating and applying thermal energy within the heating chamber to heat the articles, combustion air supply means for supplying air to the combustion means, and thermocouple probe means including thermocouple probe rods for contacting the articles and measuring the temperature of the articles so as to regulate the energy applied to the articles by the combustion means, the improvement which comprises:

environmental temperature measuring means for measuring the temperature of the environment surrounding the thermocouple probe rods or the temperature of the actual thermocouple probe rods, and for generating an environmental temperature signal representative of the measured environmental temperature;

cooling air supply means responsive to the environmental temperature signal for selectively supplying cooling air to the thermocouple probe rods in accordance with the difference between the environmental temperature and a predetermined temperature; and

the cooling air supply means comprises regulator means for adjusting the flow of supplied cooling air to the thermocouple probe rods in accordance with the rate of air flow through the combustion air supply means.

4,889,484

PORTABLE SOIL DECONTAMINATION KILN

Zygmunt J. Przewalski, Granby, Conn., assignor to M & S Engineering & Manufacturing Co., Inc., Broad Brook, Conn.

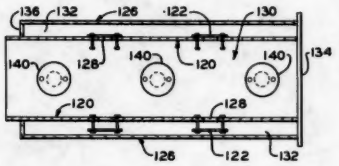
Filed Dec. 28, 1987, Ser. No. 137,968

Int. Cl.[4] F27B *7/00*

U.S. Cl. 432—103 **16 Claims**

1. Apparatus for decontaminating soil in a thermal reduction process comprising a rotary housing having an external shell and an internal drum, the drum defining an ignition chamber therein, the shell and drum jointly defining an insulating compartment therebetween in surrounding relation to the ignition chamber, the drum having one-way check valve means operated under the force of gravity between open and closed posi-

tions permitting passage of soil being processed from the ingition chamber into the surrounding insulating compartment,



that soil in the insulating compartment serving as an insulating medium for the ignition chamber.

4,889,485

ORTHODONTIC APPARATUS FOR ATTACHMENT TO A TOOTH

Eiji Iida, Okhuma, Japan, assignor to GAC International, Inc., Central Islip, N.Y.

Filed Apr. 29, 1988, Ser. No. 188,049
Claims priority, application Japan, Apr. 30, 1987, 62-107589
Int. Cl.[4] A61C *7/00*
U.S. Cl. 433—9 **21 Claims**

1. An orthodontic apparatus for attachment to a tooth, said apparatus comprising:

a base portion,

a base plate attached to said base portion, and

a plurality of layers of mesh material superimposed on the outer surface of said base plate and attached thereto, each of said layers of mesh material providing a layer of interstitial passages, said apparatus being attachable to the surface of a tooth by applying an adhesive material to said plurality of layers of mesh material and bonding said plurality of layers of mesh material directly to the surface of the tooth.

4,889,486

DEVICE FOR MOUNTING JAW CASTS IN AN ARTICULATOR

Hans Schreiber, Mierendorfstrasse 2, 6940 Weinheim, Fed. Rep. of Germany

Filed Jan. 22, 1988, Ser. No. 147,192
Claims priority, application Fed. Rep. of Germany, Jan. 24, 1987, 8701173[U]; Aug. 19, 1987, 8711262[U]
Int. Cl.[4] A11C *11/60*
U.S. Cl. 433—60 **28 Claims**

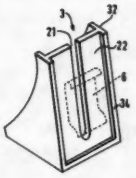
1. A device for mounting jaw casts in an articulator, comprising:

a cast plate for supporting a jaw cast;

an articulator base plate;

inclined members adjustably connected to said articulator base plate, each of said inclined members being longitudinally and transversely movable and axially rotatable; and

fixation elements, each of which is slidably connected to said cast plate and adjustably connected to a corresponding



one of said inclined members, said fixation elements slidably movable in the inclination of said inclined members and lockable in a predetermined position along said inclined members, said cast plate being pressed against said inclined members and fixed in position.

4,889,487

ENDODONTIC FILES

Leeland M. Lovaas, 40 Via Larga Vista, Bonsall, Calif. 92003

Filed Nov. 23, 1988, Ser. No. 275,213
Int. Cl.[4] A61C *5/02*
U.S. Cl. 433—102 **18 Claims**

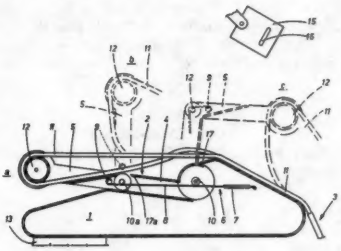
1. An endodontic file comprising a flexible filing shaft having a filing portion extending along the length thereof from a first end, said filing portion having one or more bow-shaped bends therealong for being urged against a root canal for enlarging or shaping said canal.

4,889,488

COMPACT APPARATUS FOR THE SUPPORT OF SUSPENDED POWER DRIVEN INSTRUMENTS, IN PARTICULAR FOR DENTAL SURGERY INSTRUMENTS

Franco Castellini, Bologna, Italy, assignor to Castellini S.p.A., Bologna, Italy

Filed Feb. 18, 1988, Ser. No. 161,448
Claims priority, application Italy, Feb. 27, 1987, 3364 A/87
Int. Cl.[4] K61C *1/06*
U.S. Cl. 433—110 **6 Claims**



1. A compact apparatus for the support of suspended power

driven instruments in particular for dental surgery instruments comprising:

a table;

at least one arm, carrying a relative suspended instrument which is hinged to the table and split into at least a first and a second member articulated consecutively one with the other and capable of movement between a retracted stowed position in which said first and second member are disposed substantially axially aligned one to each other and horizontally and parallel to said table and an extended operating position in which said first member is rotated of approximately a right angle with respect to said table and said second member is rotated approximately of a right angle with respect to said first member in the same direction; and

limit means, associated with the members and/or with the table, able to limit the angle of rotation allowed to each member in relation both to the remaining member and to the table.

4,889,489

DEVICE WITH SPINDLE AND GRINDING DISK, PARTICULARY FOR DENTISTS, AND METHOD FOR THE MANUFACTURE THEREOF

Beat Von Weissenfluh, Gentilino, Switzerland, assignor to Hawe-Neos Dental Dr. H.v. Weissenfluh AG, Switzerland

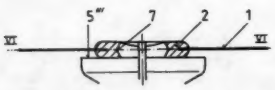
PCT No. PCT/CH87/00039, § 371 Date Feb. 25, 1988, § 102(e) Date Feb. 25, 1988, PCT Pub. No. WO88/00029, PCT Pub. Date Jan. 14, 1988

PCT Filed Apr. 7, 1987, Ser. No. 168,007

Claims priority, application Switzerland, Jun. 26, 1986, 2592/86

Int. Cl.[4] A61C *3/06*

U.S. Cl. 433—134 **13 Claims**



1. A spindle and grinding disk combination comprising:

a rotatable spindle, having an end, the spindle end being radially slit and the end being elastically deformable such that squeezing pressure applied to the spindle end can be absorbed by deflection of the spindle end at the slit; the spindle end having an outwardly facing end face, a portion of the spindle end protruding from the end face, the protruding portion also being radially slit and also having a periphery which is profiled;

the grinding disk including a hub, the hub resting on the end face of the spindle end with the grinding disk installed on the spindle; a groove formed in the hub complementary to the peripheral profile of the protruding portion of the spindle end for receiving the protruding portion, and the hub groove being sized for the hub to grip securely on the protruding portion of the spindle end for connecting the spindle end and the disk for fixed rotation with each other.

4,889,490

DENTAL MASK

Jeffrey A. Jenkinson, Rte. 2 Keoway Village Apartments, Apt. F-3, Seneca, S.C. 29678

Filed Feb. 11, 1988, Ser. No. 155,126

Int. Cl.[4] A61C *5/14*

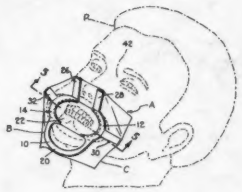
U.S. Cl. 433—136 **19 Claims**

1. A dental mask device adapted for insertion in the oral cavity of a dental patient for supporting a protective sheet covering a surrounding facial area of the patient for protection against contact by airbone contaminant particles and the like resulting from dental work while retracting the patient's cheeks, said device comprising:

a flexible mask frame;

a pair of cheek retractors carried by said mask frame which are pivotable within said oral cavity; and

support means Carried by said mask frame for attaching said



protective sheet to said mask frame in a position that said patient's oral cavity is open for said dental work and the patient's nose is unobstructed for proper breathing while said facial area of said patient surrounding said open oral cavity is covered by the protective sheet to protect against deposition of said contaminant particles discharged from the oral cavity during dental work.

4,889,491

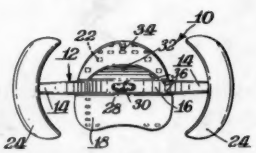
DENTAL THROAT SHIELD

S. James Krygier, P.O. Box 155, Montchanin, Del. 19710, and Alexander DeMayo, 10 Ferndale Dr., Runnemede, N.J. 08078

Continuation-in-part of Ser. No. 167,543, Mar. 14, 1988, abandoned. This application May 20, 1988, Ser. No. 196,533

Int. Cl.[4] A61C *5/14*

U.S. Cl. 433—136 **14 Claims**



1. A dental throat shield comprising a support member, a shield member attached to said support member, said support member being laterally bowed and made of a springy material, said shield member being vertically bowed shaped, said bowed shaped shield member being made of a resilient and shape retaining and soft and flexible material so as to conform to and cover the throat area of a patient, and a plurality of openings throughout the area of said shield member with said openings being of a size to permit the patient to breathe and to prevent objects from falling into the patient's posterior throat area, esophagus and trachea.

4,889,492

HIGH CAPACITANCE TRENCH CAPACITOR AND WELL EXTENSION PROCESS

John M. Barden, Albuquerque, N. Mex., and Howard K. H. Leung, Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 7, 1986, Ser. No. 860,738

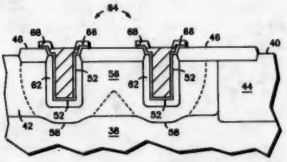
Int. Cl.[4] H01G *7/00*

U.S. Cl. 437—15 **17 Claims**

1. A process for making trench devices in a semiconductor substrate comprising:

forming a well of a first conductivity type in a face of the semiconductor substrate, the well having a bottom;

forming a plurality of trenches within the well, the trenches extending down into the well from the substrate face, each trench having a plurality of interior surfaces, one of which is a bottom surface shallower than the bottom of the well, defining an interior space;



forming a region of extra doping of the first conductivity type extending from each of the trenches outward into the well; and

forming a doped trench face extending over the interior surfaces of each trench, the trench face being doped with an impurity of a second conductivity type; and

forming a thin dielectric layer over the interior surfaces of the trench.

4,889,493

METHOD OF MANUFACTURING THE SUBSTRATE OF GAAS COMPOUND SEMICONDUCTOR

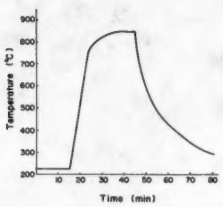
Yasuo Otsuki, and Yoshio Nakamura, both of Yokohama, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Aug. 9, 1988, Ser. No. 229,993

Claims priority, application Japan, Aug. 13, 1987, 62-202223

Int. Cl.[4] C30B *15/00, 33/00;* H01L *21/265*

U.S. Cl. 437—265 **3 Claims**



1. A method of manufacturing a substrate of a GaAs compound semiconductor, comprising annealing an ingot of a crystal of GaAs compound semiconductor obtained by the liquid encapsulated Czochralski method, gradually cooling the annealed ingot to room temperature, cutting off a wafer therefrom, reheating said wafer by heating it to a temperature of not lower than 700° C., rapidly cooling the wafer from the temperature of not lower than 700° C. to a temperature of not higher than 400° C. within 30 minutes and successively cooling the wafer to room temperature.

4,889,494

DEVICE FOR TRANSMISSION OF ELECTRICAL CURRENTS AND ROTATING MACHINE PARTS

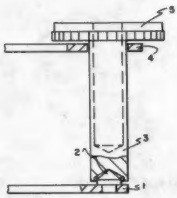
Anton Kunz, Triesenberg, Fed. Rep. of Germany, assignor to Balzers Aktiengesellschaft, Furstentum, Liechtenstein

Filed Nov. 17, 1987, Ser. No. 122,117

Claims priority, application Switzerland, Nov. 21, 1986, 04674/86

Int. Cl.[4] H01R *39/00*

U.S. Cl. 439—13 **14 Claims**



1. A substrate arrangement for carrying an element to be coated, comprising:

a first support carrier;

a second support carrier spaced from said first carrier;

a first machine part formed of metal and having a first contact-making surface, said first contact-making surface being one piece with said first machine part and being shaped in the form of a conical tip;

a second machine part made of metal and having a second contact-making surface, said second contact-making surface being one piece with said second machine part and being shaped in the form of a conical recess, said second machine part extending through a bore of said second carrier and supporting a substrate carrier on a side of said second carrier opposite said first carrier, said first and second machine parts being rotatably arranged relative to each other about a rotational axis, said first contact-making surface being engaged with said second contact-making surface, said conical tip of said first machine part having a major axis coinciding with said rotational axis, said conical recess of said second part having a major axis coinciding with said rotational axis, said conical recess of said econd machine part having a larger conical angle than said conical tip of said first machine part, said first and second contact-making surfaces defining an electrical connection connected to said substrate carrier having a current density of at least 50 amperes per cm^2.

4,889,495

CONNECTING MECHANISM FOR MEMORY CARD

Masatoshi Kimura, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jan. 4, 1989, Ser. No. 295,623

Claims priority, application Japan, Sep. 8, 1988, 63-223545

Int. Cl.[4] H01R *3/06;* H05K *1/04*

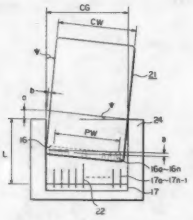
U.S. Cl. 439—60 **6 Claims**

1. A connecting mechanism for a memory card for connecting a detachable memory card and terminal equipment, comprising:

connector means including a card-side connector and a terminal equipment-side connecter, in which a difference in the length of terminals is provided between a grounding terminal and terminals other than said grounding terminal in such a manner as to establish an electrical sequence in which, during insertion of said memory card, said grounding terminal makes an electrical contact in advance of the other said terminals and is electrically separated by lagging behind said other terminals;

card guide means provided on said terminal equipment side

and having predetermined dimensions for restricting an angle of inclination of said memory card during insertion or withdrawal thereof so as to obtain said electrical sequence; and



a unilateral or bilateral terminal equipment-side buffer circuit provided for all input/output lines excluding a power input line and a grounding line in said terminal equipment, whereby the insertion or withdrawal of activated lines is made possible with respect to said input/output lines excluding a card enable signal line.

4,889,496

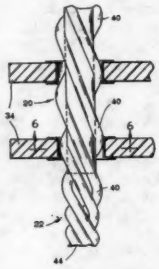
COMPRESSIBLE CORE ELECTRICAL CONNECTOR

Douglas A. Neidich, Harrisburg, Pa., assignor to InterCon Systems, Inc., Harrisburg, Pa.

Continuation of Ser. No. 180,387, Apr. 12, 1988, abandoned. This application Jan. 23, 1989, Ser. No. 300,193

Int. Cl.[4] H01R *9/09, 4/56*

U.S. Cl. 439—75 **28 Claims**



1. An elongate compressible core electrical connector including:

(A) a plurality of conductive spiral strands each being wound in the same direction and extending along the length of the connector; and

(B) an elongate resilient core including a corner, said core being confined within the spiral strands with at least one strand bent around the corner to form a contact and defining a contact portion extending a distance along the length of the connector;

(C) the strands at one end of the contact portion extending beyond the contact portion a distance approximately equal to the length of the contact portion and being spiral wound together to define an elongate lead-in portion having a transverse cross-sectional smaller than the transverse cross-section of the contact portion;

(D) whereby the lead-in portion of the connector may be freely piloted into a circuit board hole having an area greater than the transverse cross-section of the lead-in portion of the connector and less than the transverse cross-section of the contact portion and then pulled through the hole to move the contact portion into the hole, compress the core and bias the contact against the hole to form an electrical connection between the strand and the surface of the circuit board hole.

4,889,497

SHIELDED ELECTRICAL CONNECTOR

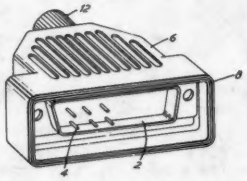
Arthur J. Riches, Kent, England, assignor to Amphenol Corporation, Wallingford, Conn.

Filed Aug. 22, 1988, Ser. No. 234,923

Claims priority, application United Kingdom, Aug. 28, 1987, 8720369

Int. Cl.[4] H01R *13/648, 13/66*

U.S. Cl. 439—76 **12 Claims**



1. A shielded electrical connector comprising a conductive connector housing to receive a shielded cable, means to connect the cable shield to the connector housing, a connector element located in the housing and having contacts connected to respective tracks on a printed circuit board within the housing, a ground plane spaced from the printed circuit board and electrically connected to the connector housing, and a plurality of surge arrestors located between respective tracks on the printed circuit board and the ground plane.

4,889,498

MEMORY CARD HAVING AN ELASTOMER CONNECTOR

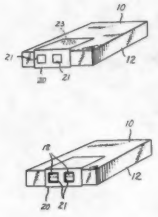
Masaharu Mizuta, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Oct. 19, 1988, Ser. No. 259,809

Claims priority, application Japan, Oct. 21, 1987, 62-161530[U]

Int. Cl.[4] H01B *4/58*

U.S. Cl. 439—86 **7 Claims**



1. A memory card electrically connectable to an external electrical device through a connector, said connector having a male contact including a plurality of connecting pins, said memory card comprising:

a card-shaped housing;

an electronic component disposed within said housing;

a female contact disposed within said housing and accessible by the male contact from outside of said housing; and

connecting means for electrically connecting said electronic component and said female contact,

said female contact comprising an elastomer connector

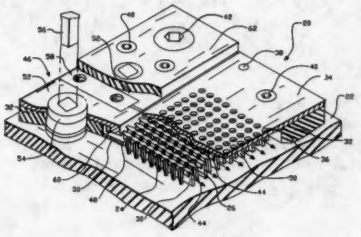
having an electrically insulating elastomer and a plurality of electrically conductive fine fibers having a first and a second end, said conductive fibers extending through and supported by said elastomer for independent electrical conduction therethrough, the arrangement of said conductive fibers being such that each of said connecting means is electrically connected to the first end of at least one of said conductive fibers and each of the pins of the male connector is engageable with the second end of at least one of said conductive fibers.

4,889,499

ZERO INSERTION FORCE CONNECTOR

Jerzy Sochor, Santa Cruz, Calif., assignor to Amdahl Corporation, Sunnyvale, Calif.

Filed May 20, 1988, Ser. No. 196,726
Int. Cl.[4] H01R *13/62*
U.S. Cl. 439—268 **28 Claims**



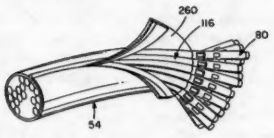
1. A zero insertion force connector, comprising:
a motherboard;
a plurality of contacts provided in rows on said motherboard;
plural drawbar means for engaging said contacts, each said drawbar means being provided between adjacent rows of contacts;
actuator means for moving alternate drawbar means in opposite directions to engage said plural drawbar means with said contacts and to actuate said contacts.

4,889,500

CONTROLLED IMPEDANCE CONNECTOR ASSEMBLY

Michael Lazar, White Plains, N.Y., and Rocco Noschese, Wilton, Conn., assignors to Burndy Corporation, Norwalk, Conn.

Filed May 23, 1988, Ser. No. 197,775
Int. Cl.[4] H01R *17/18*
U.S. Cl. 439—579 **45 Claims**



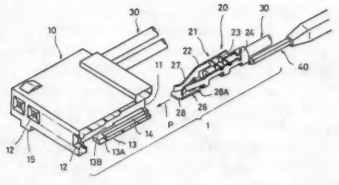
1. A controlled impedance connector assembly comprising:
a receptacle of dielectric material adapted to be mounted on a printed circuit board having a plurality of metallized through holes therein, said receptacle including a planar base member lying generally parallel to and proximately spaced from a planar surface of the printed circuit board, said base member having a plurality of first and second laterally spaced mounting holes extending transversely therethrough;
a plug matingly engageable with said receptacle including a dielectric housing, electrically conductive grounding block means mounted in said housing having a plurality of first and second sockets extending transversely therethrough, and a plurality of coaxial terminals, each having an outer conductive sleeve permanently coupled to the outer braided shield of a coaxial cable lead and mechanically and electrically engageable with an associated one of the first sockets and an inner conductive sleeve electrically coupled to a signal wire;
a plurality of elongated signal pin contacts, each being fittingly received in an associated one of the first mounting holes in said base member and extending between a nose end and a tail end, said nose end having a first resilient contact member engageable with an associated one of said inner sleeves of said coaxial terminals at a first predetermined distance away from the printed circuit board, said tail end of each of said signal pin contacts being engageable with an associated through hole in the printed circuit board and electrically coupled thereto;
a plurality of elongated ground pin contacts, each being fittingly received in an associated one of the second mounting holes and extending between a nose end and a tail end, said nose end of each of said ground pin contacts having second and third longitudinally spaced resilient contact members engageable with an associated one of the second sockets of said grounding block, each of said second contact members being engaged with its associated second socket at a second predetermined distance away from the printed circuit board which is greater than the first predetermined distance, each of said third contact members being engaged with its associated second socket at a third predetermined distance away from the printed circuit board which is less than the first predetermined distance, said tail end being engageable with and electrically coupled to an associated through hole in the printed circuit board, the through hole being coupled to ground potential for coupling each of said second and third contact members to the ground potential;
whereby, as said plug is moved toward said receptacle for mating engagement therewith, the first socket of said grounding block first receivably engages said second contact member, then said inner sleeve of said coaxial terminal receivably engages said first contact member, and finally the first socket of said grounding block receivably engages said third contact member, and vice versa as said plug is withdrawn from said receptacle, to thereby provide maximum electromagnetic shielding for each of the signal wires.

4,889,501

ELECTRICAL CONNECTOR

Kensaku Sato, Tokyo, Japan, assignor to Hirose Electric Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 96,489, Sep. 15, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 323,128
Claims priority, application Japan, Sep. 24, 1986, 61-244732
Int. Cl.[4] H01R *13/40*
U.S. Cl. 439—595 **3 Claims**



1. An electrical connector comprising:
an insulating housing having front and rear ends and a plurality of receiving apertures each extending between said

front and rear ends and having at top, a bottom, and opposing sides;

a plurality of contacts adapted to be inserted into said receiving apertures so that each contact rests on said bottom of said aperture and each having a connection section and a contact section for making a contact with a contact of a mating connector;

said contact section including a base plate extending forward and a pair of contact pieces extending forward along and above said base plate;

a cantilevered resilient latch arm defined by a U-shaped cut on said bottom of said receiving aperture so as to extend forwardly from a middle of said receiving aperture in the same plane as that of said bottom;

latch means provided on a central area of said base plate so as to engage said latch arm when said contact is inserted into said receiving aperture beyond a predetermined distance; and

a receiving groove extending forwardly from said rear end of said insulating housing on said cantilevered resilient latch arm to such an extent that insertion of a rod portion of a pulling out tool into an elongated space defined by said receiving groove and a bottom of said contact releases said latch arm from said latch means.

4,889,502

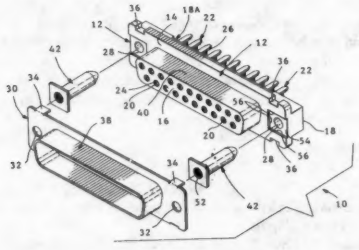
CONNECTOR HAVING DROP-IN INSERT CONDUCTIVE WITH SHELL

Rickie M. Althouse, 2000 Haddam Neck Ct., Harrisburg, Pa. 17110; Richard I. Baer, 1030 Laurel Dr., Middletown, Pa. 17057, and Ronald L. Brandt, R.D. #2, Box 41D, Palmyra, Pa. 17078

Continuation-in-part of Ser. No. 79,204, Jul. 29, 1987, abandoned. This application Sep. 16, 1988, Ser. No. 245,836

Int. Cl.[4] H01R *13/658*

U.S. Cl. 439—607 **25 Claims**



19. An electrical connector assembly comprising:

a dielectric housing defining a mating face and a mounting face, said housing having a plurality of terminal receiving passages extending from the mating face;

flange means having an aperture therethrough;

an insert extending into the aperture in the flange means, said insert having a hollow shaft, said insert having integral flange means engaging said flange means for preventing rotation of said insert, said insert having internal threads in said hollow shaft for receiving a complementary securing means; and

an electrically conductive shell, said shell having means for securing the shell to said flange means, said shell having a shroud portion disposed proximate the mating face to engage shielding of a complementary shielded connector, said shell electrically conductive with the insert, said shell having an aperture aligned with said shaft of said insert.

4,889,503

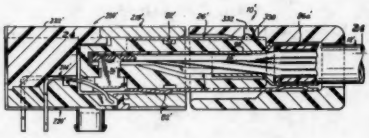
SHIELDED PLUG AND JACK CONNECTOR

Walter M. Philippson, Woodside; Robert J. Brennan, Ossining, and Terrence Meighen, Stormville, all of N.Y., assignors to Stewart Stamping Corporation, Yonkers, N.Y.

Division of Ser. No. 800,679, Nov. 22, 1985, Pat. No. 4,781,623, which is a continuation-in-part of Ser. No. 655,696, Sep. 28, 1984, Pat. No. 4,653,837, which is a continuation-in-part of Ser. No. 612,722, May 21, 1984, Pat. No. 4,641,901, which is a continuation-in-part of Ser. No. 570,806, Jan. 16, 1984, Pat. No. 4,537,459. This application Sep. 22, 1988, Ser. No. 247,878

Int. Cl.[4] H01R *23/02, 13/648*

U.S. Cl. 439—610 **3 Claims**



1. A plug and cable combination, comprising:

a plug including,

a housing assembly including a front housing part and a rear housing part separate from said front housing part; said front housing part having top, bottom and side walls defining a front interior cavity portion and a plurality of contact-receiving slots formed in said bottom wall communicating with said front interior cavity portion for receiving flat contact terminals; said rear housing part defining a rear interior cavity portion; and

interference shielding means extending around the circumference of at least said front housing part over the exterior of said top, bottom and side walls thereof for attenuating interference radiation into and out from said plug;

a cable including an outer jacket and a plurality of conductors enclosed within said outer jacket and having exposed portions extending beyond an end region of said jacket, said exposed conductor portions being situated within said front interior cavity portion in alignment with respective said contact-receiving slots, and said end region of said jacket being situated within said rear interior cavity portion;

said interference shielding means surrounding at least some of said exposed conductor portions,

said cable further including a conductive shield sheath situated between said jacket and said conductors and surrounding said conductors, said combination further including means for electrically coupling said interference shielding means and said cable shield sheath, said interference shielding means adapted to electrically engage an electrically grounded conductive part of a jack upon insertion of said plug into the jack to electrically ground said cable shield sheath.

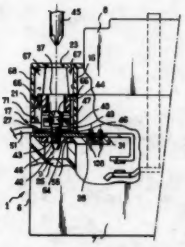
said shield sheath including a portion which is exposed in the area of the exterior of said jacket end region, said coupling means including an electrically conductive ferrule-like member surrounding said jacket end region and electrically engaging said exposed portion of said cable shield sheath, said interference shielding means being in electrical engagement with said ferrule-like member, and said means for extending around the circumference of said front housing part comprising a shield sleeve formed of conductive sheet metal having an extension strip which is one piece with said shield sleeve and which extends into said rear interior cavity portion and electrically engages said ferrule-like member.

4,889,504

ELECTRIC COUPLING DEVICE, A CIRCUIT-BREAKER EQUIPPED THEREWITH AND A RELATED ASSEMBLY OF COMPONENTS

René Barbier, Quetigny, and Serge Guenin, Talent, both of France, assignors to La Telemecanique Electrique, Nanterre Cedex, France

Filed Sep. 1, 1988, Ser. No. 239,385
Claims priority, application France, Sep. 11, 1987, 87 12609
Int. Cl.[4] H01R *9/24, 13/502*
U.S. Cl. 439—712 **14 Claims**



1. An electric coupling device for the terminal (2, 4) of an electric equipment unit, which is intended to removably couple an electric cable conductor (51) with a conductive surface (27) of said unit, said coupling device being provided with a housing (9) formed within a casing (1) of the equipment unit and adapted to communicate with the exterior of the casing through an opening (17) for introduction of the cable conductor 51 and through an opening (23) for introduction of a screwdriver (45), a stationary gripping member (28) which carries the conductive surface (27) and a movable gripping member (48), said gripping members drawn towards each other by clamping means (42) which can be actuated by the screwdriver, wherein an adapter (52) is fitted substantially without play within the housing (9) of the casing (1), said adapter being provided with a cavity in which the gripping members (28, 48) are positioned and in which the movable gripping member (48) is guided, said adapted being also provided with openings (59, 81) opposite to the openings (17, 23) of the housing (9), whereby said adapter allows for positioning in the relatively large housing (9) not only relatively large-sized cables but also relatively small gripping members (38, 48) suitable for relatively small-sized cables.

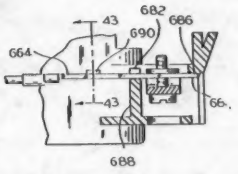
4,889,505

TERMINAL ASSEMBLY FOR A COIL

James P. Schmiedel, Brown Deer, and Lawrence D. Moye, Shorewood, both of Wis., assignors to Square D Company, Palatine, Ill.

Division of Ser. No. 721,983, Apr. 9, 1985, Pat. No. 4,705,341.
This application Mar. 9, 1987, Ser. No. 23,749
The portion of the term of this patent subsequent to Apr. 11, 2006, has been disclaimed.
Int. Cl.[4] H01R *13/422*
U.S. Cl. 439—733 **11 Claims**

1. A terminal assembly for a coil comprising:
a housing made of molded insulating materials having a first sidewall and a second sidewall;
a projection molded into said housing adjacent said first sidewall;
a lug made of electrically conductive material, said lug having a first lug end, a second lug end, and first and second lug sides extending between said lug ends, and having a recess defined in only one of said lug sides accepting said projection molded into said housing for preventing translating motion of said lug in a first direction, reverse translating motion opposite to said first direction, and translation motion in a fourth direction;
a support molded into said housing supporting said lug and for preventing motion of said lug in a second direction;
a lip, molded into said housing, and said lip accepts a first end of said lug for preventing motion of said first end of said lug in a third direction;



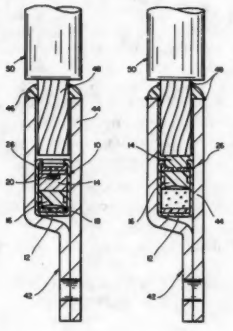
a finger molded into one of said housing sidewalls securing a second end of said lug for preventing motion of said second end of said lug in said third direction, thereby retaining said lug in said housing; and
said second sidewall prevents reverse translation motion opposite to said fourth direction.

4,889,506

SOLDER DELIVERY DEVICE

Joseph Connolly; Neil L. Holt, both of Redwood City; Anthony R. W. Richardson, Los Altos Hills, and Jay Siedenburg, Woodside, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Filed Nov. 3, 1988, Ser. No. 266,418
Int. Cl.[4] H01R *4/02*
U.S. Cl. 439—874 **14 Claims**

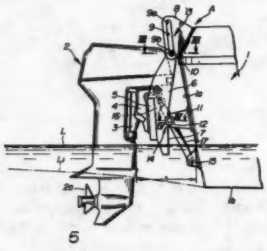


1. A self-contained solder delivery device comprising:
(a) a tubular housing having tubular side walls, one end of which is closed and the other end of which contains an opening;
(b) a quantity of solder and flux positioned within the housing toward the open end thereof; and
(c) means within the housing between said solder and said closed end for pressuring the solder through said opening when the solder is molten, and
wherein said solder, flux, and pressuring means substantially fill the housing so that a substantial length of a conductor cannot be inserted therein.

4,889,507
OUTBOARD PROPULSION UNIT SUPPORTING SYSTEM

Hideo Tahara; Novuo Makihara, and Hiroshi Ono, all of Yokosuka, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Dec. 7, 1987, Ser. No. 129,551
Claims priority, application Japan, Oct. 13, 1987, 62-257514
Int. Cl.[4] B63H *21/26*
U.S. Cl. 440—61 19 Claims



1. An outboard propulsion unit supporting system for a boat, comprising:

first supporting means by which an outboard propulsion unit is supported to the boat, said first supporting means including means defining a slit extending generally vertically and having upper and lower terminals, and a movable member engaged in said slit, wherein one of said slit and said movable member is vertically movable with respect to the other;

second supporting means by which the propulsion unit is supported to the boat, said second supporting means including means forming a guide rail extending generally vertically, and a support member detachably contactable with said guide rail, wherein one of said guide rail and said support member is movable with respect to the other, and further wherein said movable member and said guide rail are in fixed relationship relative to one another, and wherein said slit and said support member are in a fixed relationship relative to one another; and

a hydraulic cylinder whose whole length is changeable to move said propulsion unit relative to the boat, said hydraulic cylinder having a first end section pivotally connected to the side of the boat and a second end section pivotally connected to the side of the propulsion unit, said second end section being positioned upper and rear relative to said first end section.

4,889,508
BOW FACING ROWING SYSTEM

George V. Freeman, 115 Linden St., South Hamilton, Mass. 01982, and Roland T. Freeman, 344 Lake Dr., Hamilton, Mass. 01936

Filed Sep. 21, 1988, Ser. No. 247,418
Int. Cl.[4] B63H *16/10*
U.S. Cl. 440—103 9 Claims

1. A bow facing rowing system comprising the solution of an oar reversing device and a bracket device for supporting said oar reversing device;

said oar reversing device including:

a housing having opposing ends which terminate in a pair of upper and lower flanges defining fixed spaces therebetween;

said housing memer having a rounded base surface;

a train of gears disposed essentially within said housing;

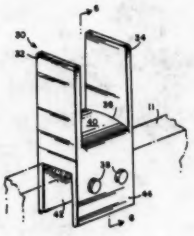
one end gear of the train of gears forming a first terminal gear having an integral extension passing through the adjacent fixed space and terminating in means to releasably receive an oar member;

the opposite end gear of the train of gears forming a second terminal gear having an integral extension passing through an adjacent fixed space and terminating in means to releasably receive a handle member;

said gears intermeshing in the same plane to thereby transmit motion in reverse from said handle member to said oar member; and

a bracket device for supporting said oar reversing device including:

at least one base flange member adapted to be mounted on a boat;



a pair of spaced side bearing plates attached to said base plate and positioned in vertical aligment relative to each other above said base flange member; and

a convex base bearing plate disposed between and attached to said side bearing plates;

said side and convex base bearing plates forming a receptacle to receive said housing member so that the rounded base surface of said housing member contacts said convex base bearing plate creating a fulcrum point whereby vertical motion applied to said handle member is transmitted to said oar member.

4,889,509
SLIDEABLE OUTRIGGER

Günther Pohlus, Klosterwag 26, D-8137 Berg 3, Fed. Rep. of Germany

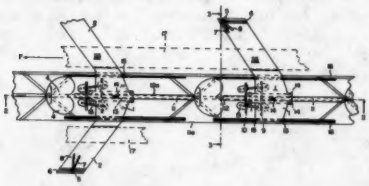
Continuation of Ser. No. 2,667, Dec. 12, 1986, abandoned. This application Sep. 2, 1988, Ser. No. 241,816
Claims priority, application Fed. Rep. of Germany, Apr. 19, 1985, 3514105; Apr. 23, 1985, 3514566
Int. Cl.[4] B63H *16/067*
U.S. Cl. 440—105 21 Claims

1. A rowboat with a hull and at least one fixed rowing seat, and at least one outrigger which slides in relation to its corresponding rowing seat disposed in the longitudinal direction of the boat, each outrigger having a stretcher affixed thereto and for moving therewith,

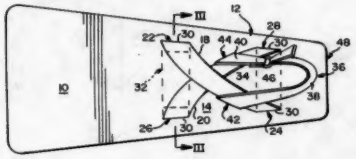
the at least one outrigger being slideably mounted for sliding forward or backward like a sled on linear guide means, said linear guide means comprising a single central linear guide being substantially fixed to said hull;

said linear guide means comprising two sets of restraining means affixed to said at least one outrigger spaced length-

wise at a substantial distance apart along said central guide to minimize tipping of the at least one outrigger during backward and forward movement of said at least one outrigger.



4,889,510
HARNESS FOR SWIM FINS
John A. Piatt, 226 Getchell St., Santa Cruz, Calif. 95060
Filed Jun. 3, 1988, Ser. No. 202,109
Int. Cl.[4] A63B *31/14*
U.S. Cl. 441—63 4 Claims



1. Harness for securing a swim fin beneath a wearer's foot, comprising

a single strap having two strap portions each having respective front and rear anchor points on opposite sides of the fin relative to the wearer's foot, the strap portions being arranged in an X configuration relative to each other and being of a suitable length for passing over the wearer's instep, said single strap having opposite end portions passing downwardly through the respective front anchor point and being overlapped and secured to each other beneath the fin to assure a positive coupling therebetween, and

an adjustable heel strap secured to the respective strap portions forward of their rear anchor points, the adjustable heel strap being of a suitable length for adjustable engagement behind and above the wearer's heel.

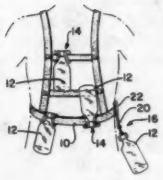
4,889,511
FLOTATION ASSEMBLY
Martin A. Herman, 2085 W. 114th St., Cleveland, Ohio 44102
Filed Aug. 29, 1988, Ser. No. 237,078
Int. Cl.[4] B63C *9/12*
U.S. Cl. 441—88 3 Claims

1. A life vest flotation assembly comprising in combination:

a harness having a waist belt, a pair of shoulder straps and at least one horizontal connecting strap between the shoulder straps,

at least two attachment components each having a flat section with a pair of elongate parallel apertures therein to receive and to pass there through a section of said harness and at least one of said components also having an offset section extending from said flat section, and

a bottle closure device coupleable to said attachment components including a hollow generally cylindrical portion, said cylindrical portion having a bore closed at one end and opened at its other end, said bore being threaded for engagement with the threaded neck of a bottle.



4,889,512
DOLL AND PILLOW CARRYING CASE
Ronald D. Burnett, 5111 Terrell La., Hampton, Va. 23666, and Mildred M. Burnett, 1109 Blair Ave., Hampton, Va. 23669
Filed Aug. 11, 1988, Ser. No. 231,677
Int. Cl.[4] A63H *3/02*
U.S. Cl. 446—72 1 Claim

1. A soft sculptural toy comprising in combination:

(a) a pillow having a decorative exterior cover;

(b) a soft filler material enclosed within said decorative exterior cover, said soft filler material being selected from the group of filler materials consisting of cotton, nylon, and foam rubber;

(c) a handle attached to one end of said pillow;

(d) a pocket attached to the exterior of said decorative exterior cover, said pocket having essentially the same peripheral measurements as said pillow and permanently attached to both sides and one end thereof, and unattached to the pillow end having said handle attached thereto;

(e) a soft sculptural human figure doll positioned within said pocket and extending from the end thereof that is not permanently attached to said pillow; said doll being of a length substantially exceeding the length of said pillow and having a head, a body, a pair of arms and a pair of legs, and wherein said legs are folded back over and behind the doll body to permit insertion of said doll within said pocket; said doll having an exterior constructed of cloth and yarn and a soft filler material interior selected from the group of filler materials consisting of cotton, nylon, and foam rubber;

(f) means for releasably retaining said doll within said pocket, said means for releasably retaining said doll within said pocket including an elastic band extending the length of and connected to the end of said pocket that is not permanently attached to said pillow, said elastic band engaging said doll beneath the arms thereof and serving to elastically bind against said doll to releasably retain said doll body and legs within said pocket while leaving exposed said head and arms of said doll, and when said doll is removed from said pocket, said elastic band serving to

bias the unattached end of said pocket against said pillow; and

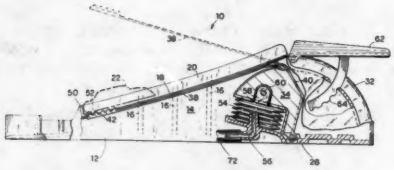
(g) cooperating connecting means disposed on the exterior of said pocket and beneath the arms of said doll, said cooperating connecting means being selected from the group of connecting means consisting of (a) button/button holes, (b) snap fasteners, and (c) strips of fabric having interconnecting extensions thereon.

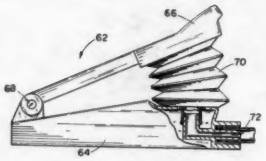
4,889,513

TOY RACE CAR LAUNCHER

Charles W. Paddock, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Oct. 11, 1988, Ser. No. 255,366
Int. Cl.[4] A63H *18/00*
U.S. Cl. 446—197 **7 Claims**





1. A toy race car launcher for a car having at least one drive wheel and at least one tooth on the bottom thereof comprising:

a launcher body;

an upwardly inclined car support track on the launcher body having an elongated slot at the car launching station;

a recess in the track for receiving and disengaging the drive wheel from the track and stopping a moving car in a car launching position;

a remotely actuable flexible strip having a toothed rack at one end thereof slidably movable within the slot for movement from the car launching position, and a movable member secured to the opposite end of the flexible strip; and

moving means for moving the movable member, for imparting movement to the toothed rack for engaging the car tooth and causing the strip and tooth rack thereon to move therewith for launching the car from the car support track.

4,889,514

BLINKING TOY VEHICLE

Robert T. Auer, East Stroudsburg, Pa.; Richard L. Keats, Sands Point, N.Y., and Jore M. Chung, Jackson, N.J., assignors to Buddy L Corp., New York, N.Y.

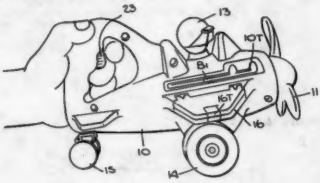
Filed Nov. 9, 1988, Ser. No. 269,116
Int. Cl.[4] A63H *27/00, 5/00, 17/28, 33/26*
U.S. Cl. 446—230 **9 Claims**

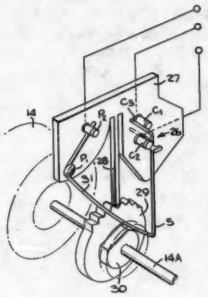
1. A hand-propelled toy vehicle having a body and provided with a battery power supply, a set of wheels mounted on an axle and a U-shaped handle whose ends are secured to the body, the handle to be grasped by a player to propel the vehicle along a playing surface, said vehicle comprising:

(a) a trigger-actuated, spring loaded, normally open switch mounted on an inner surface of the handle, the switch being closed by the player when grasping the handle and in doing so squeezing the trigger;

(b) an interrupter switch operatively coupled to the axle, whereby as the axle rotates, this switch is periodically opened and closed at a rate that depends on the speed of rotation;

(c) at least first and second light bulbs disposed in the vehicle; and





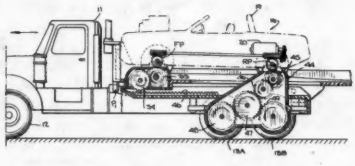
(d) circuit means connecting the first bulb through the handle switch in parallel with the interrupter switch to said supply and also connecting said second bulb through the handle switch in series with the interrupter switch to said supply, whereby when a player actuates the handle switch and the interrupter switch is then closed but the vehicle is not yet being propelled, the first bulb is then turned on, and when the vehicle is thereafter propelled by the handle, the second bulb is turned on intermittently to produce a blinking light action, neither bulb being turned on when the handle is not grasped by the player.

4,889,515

FOUR-WHEEL DRIVE TOY AND TRUCK ASSEMBLY

Robert T. Auer, East Stroudsburg, Pa., and David Reina, Maplewood, N.J., assignors to Buddy L Corporation, New York, N.Y.

Filed Oct. 29, 1987, Ser. No. 114,283
Int. Cl.[4] A63H *17/05*
U.S. Cl. 446—428 **11 Claims**



1. A piggy back toy car nd truck assembly comprising:

A a four-wheel car having a DC motor powered through a mode selector to a battery source and operatively coupled

to front and rear drive pinions mounted on front and rear wheel axles whereby when the selector is in a forward mode, all four wheels are driven to propel the car in the forward direction, and when the selector is in the reverse mode, all four wheels are driven to propel the car in the reverse direction;

B a motorless truck provided with a flat bed having a front section on which there is a rack that extends to a rear section on which is rotatably supported a bed gear, said truck having rear wheels whose axle is below the rear section of the bed and is operatively coupled to said bed gear whereby when said bed gear is engaged by the rear drive pinion of the car operating in the forward mode, the rear wheels are then caused to rotate to propel the truck in the forward direction;

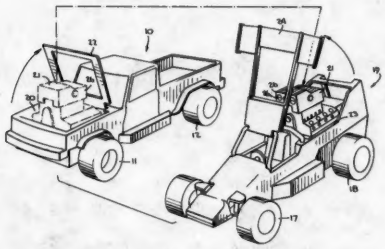
C a ramp having a pair of parallel tracks to accommodate the wheels of the car, said ramp having adjacent its front end an upper ramp gear operatively coupled to a lower ramp pinion, said ramp being slidable from a retracted horizontal position to an extended horizontal position at which about half of the ramp overhangs the rear of the bed and is then pivoted to the bed whereby the ramp can then swing down to an inclined position, making it possible for the car in the forward mode to climb the ramp until it reaches the front end thereof and causes the ramp to return to its extended horizontal position at which point the front drive pinion of the car meshes with the ramp gear to cause the associated ramp pinion which then engages the rack to advance the ramp to its retracted horizontal position, at which retracted position the rear drive pinion engages the bed gear to propel the truck.

4,889,516

PLUG-IN MODULE FOR MOTORIZED TOY VEHICLE

Robert T. Auer, East Stroudsburg, Pa., and David Reina, Maplewood, N.J., assignors to Buddy L Corp., New York, N.Y.

Filed Nov. 16, 1987, Ser. No. 122,253
Int. Cl.[4] A63H *33/04, 17/26, 29/02*
U.S. Cl. 446—462 **9 Claims**



1. The combination of a motorless toy vehicle having a body and a wheel axle and a power module adapted to plug into an open compartment in the body of said motorless toy vehicle to drive the vehicle in a desired direction, said compartment being disposed above a coupling gear mounted on said wheel axle, the module comprising:

A a case having a base;

B a DC motor housed in the case and operatively coupled to a drive pinion whose teeth project through an opening in the base to engage said coupling gear when the power module is plugged into said compartment, said case having a height exceeding that of the compartment and having a form resembling the appearance of a multi-cylinder internal combustion engine where an upper section of said case extends above the compartment and is continuously exposed to view;

C a battery supply housed in the case; and

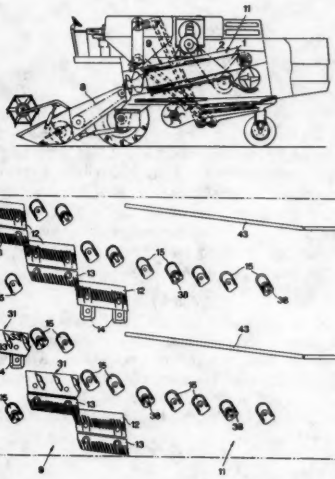
D a polarity-reversing switch including an actuator positioned on top of the case, said switch connecting said supply to said motor whereby in one switch position, the motor is energized to drive the vehicle in the forward direction, and in another position the motor is energized to drive the vehicle in the reverse direction.

4,389,517

OVERLAPPING RASP BAR ROTOR FOR AXIAL FLOW COMBINES

Russell W. Strong, Brugge, and Eric P. J. van Quekelberghe, Damme, both of Belgium, assignors to Ford New Holland, Inc., New Holland, Pa.

Filed May 5, 1989, Ser. No. 348,344
Int. Cl.[4] A01F *12/22*
U.S. Cl. 460—66 **8 Claims**



1. In an axial flow harvesting machine having at least one generally cylindrical rotor defining a generally longitudinally extending axis and being rotatably mounted within a casing and operable, in conjunction with the casing, to thresh and separate grain from straw material, and a plurality of threshing means provided around the periphery of said at least one rotor and being staggered axially thereof, the improvement comprising:

said adjacent threshing means overlapping with respect to the axis of said at least one rotor.

4,889,518

POWER TRANSMISSION DEVICE

Shinji Komata, 2-1912-2, Ogawa-machi, Kodaira-shi, Tokyo 187, Japan

Filed Dec. 23, 1987, Ser. No. 137,361
Claims priority, application Japan, Feb. 9, 1987, 62-27922
Int. Cl.[4] F16D *3/50*
U.S. Cl. 464—102 **11 Claims**

1. A power transmission device comprising

a frame;

a driven rotating body rotatably supported by said frame;

a rotating shaft extending along the rotating center axis of said driven rotating body;

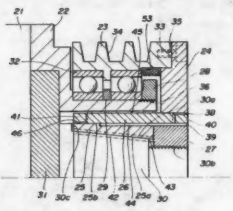
a power input member for receiving the drive force transmitted from a driving source to said driven rotating body;

a flange having a hollow cylindrical portion projected from a side of said frame along said rotating shaft;

said cylindrical portion surrounding said rotating shaft and rotatably supporting said power input member on the periphery of said cylindrical portion;

a cylindrical power relay member arranged between said power input member and said rotating shaft in a manner that said rotating shaft is accommodated in said power relay member and said power relay member is disposed along said cylindrical portion of said flange;

said power relay member swingably engaged with said power input member at one end in the longitudinal direction thereof by meshing of plural inner teeth operative with said power input member and first plural teeth of said power relay member, and engaged with said rotating shaft at the other end of said power relay member in the longitudinal direction thereof by meshing of second plural teeth of said power relay member and outer teeth operative with said rotating member.



4,889,519

COORDINATE MEASURING MACHINE

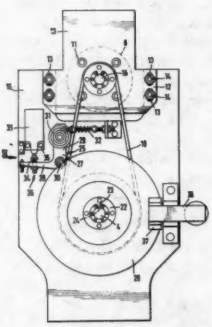
Gerhard Band, Oberndorf, and Heinz Broghammer, Zimmern, both of Fed. Rep. of Germany, assignors to Mauser-Werke Oberndork GmbH, Oberndorf, Fed. Rep. of Germany

Filed Aug. 9, 1988, Ser. No. 230,469

Claims priority, application Fed. Rep. of Germany, Sep. 5, 1987, 3729813

Int. Cl.[4] F16H *7/08*

U.S. Cl. 474—101 **7 Claims**



1. A coordinate measuring machine comprising:

a spindle sleeve supported for movement in a first direction;

a threaded spindle extending along and supported for rotary movement about a first axis, and connected to the spindle sleeve to move aid sleeve in the first direction;

a motor including a power output shaft, and adapted to rotate said output shaft about a second axis parallel to the first axis;

drive means connecting the power output shaft to the threaded spindle to rotate said threaded spindle, and including

(i) a first pulley mounted on the power output shaft for rotation therewith,

(ii) a second pulley mounted on the threaded spindle for rotation therewith,

(iii) a drive belt mounted on and extending around the first and second pulleys in driving engagement therewith, wherein rotation of the first pulley drives the belt around the first and second pulleys and rotates the second pulley, and

(iv) means engaging the drive belt to maintain tension thereon;;

a brake pulley directly connected to the second pulley for rotation therewith; and

break means including a break shoe to selectively engage the break pulley to apply a braking force thereto and to the second pulley and the threaded spindle.

4,889,520

TENSION DEVICE FOR DRIVE BELT

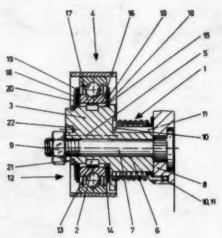
Manfred Brandenstein, Eussenheim; Gerhard Herrmann, Schweinfurt, and Roland Haas, Hofheim, all of Fed. Rep. of Germany, assignors to SKF GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Mar. 10, 1989, Ser. No. 321,907

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1988, 3810187

Int. Cl.[4] F16H *7/12*

U.S. Cl. 474—135 **33 Claims**



1. A tension device for a drive belt comprising:

a tension roller;

a supporting member on which said tension roller is supported and free to rotate;

a pivot bearing abutting said supporting member and located outside an axis of rotation of the tension roller and capable of being locked in position with respect to a structural element outside of said tension device;

a tension spring oriented so as to press the tension roller against the drive belt, said tension spring functioning to facilitate adjustment of said tension roller during assembly and said tension spring having no effect on operation of the drive belt after locking of the pivot bearing in position;

a working spring oriented so as to press the tension roller against the drive belt during operation, said working spring having a greater tension than said tension spring whereby the movement of the tension roller is limited in a direction towards said working spring and movement of the tension roller in a direction toward said drive belt is limited by a maximum length to which said drive belt can extend in the vicinity of said tension device under operating conditions.

4,889,521

MULTISTAGE SPROCKET ASSEMBLY FOR A BICYCLE

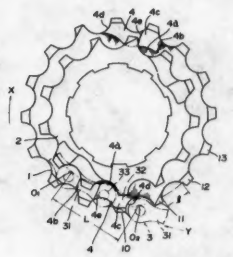
Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan

Filed Oct. 24, 1988, Ser. No. 261,323

Claims priority, application Japan, Oct. 21, 1987, 62-161539; Jun. 4, 1988, 63-74583

Int. Cl.[4] F16H *11/08*

U.S. Cl. 474—164 6 Claims



1. A multistage sprocket assembly for a bicycle, said sprocket assembly comprising:

at least one large diameter sprocket having at its outer periphery a plurality of teeth; and at least one smaller diameter sprocket having at its outer periphery a plurality of teeth smaller in number than said plurality of teeth of said larger diameter sprocket, a pair of adjacent teeth of said larger diameter sprocket having a first center point therebetween and a pair of adjacent teeth of said smaller diameter sprocket having a second center point therebetween, said first center point and said second center point being positioned on a tangent line extending along a traveling path between said smaller diameter sprocket and said larger diameter sprocket of a driving chain in engagement with said smaller diameter sprocket when said chain is being shifted from said smaller diameter sprocket to said larger diameter sprocket, a distance between said first center point and said second center point being substantially an integer multiple of a pitch between adjacent links of said chain, and said larger diameter sprocket comprising chain guide means, provided at its inside surface facing said smaller diameter sprocket and at a position of said larger diameter sprocket corresponding to said traveling path of said chain when traveling between said first center point and said second center point, for allowing said chain to move at said chain guide means farther from said smaller diameter sprocket and closer toward said inside surface of said larger diameter sprocket than at other portions of said larger diameter sprocket.

4,889,522

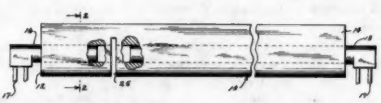
ROTARY BAG MAKING MACHINE FOR DRAWSTRING BAGS

Peter J. Gietman, Jr., Combined Locks, Wis., assignor to Custom Machinery Design, Inc., Appleton, Wis.

Filed Nov. 14, 1988, Ser. No. 270,235

Int. Cl.[4] B31B *1/64*

U.S. Cl. 493—193 9 Claims



5. An improved sealing bar for a rotary bag machine adapted to perform side sealing operations on a film web which includes along one side a paid of folded hems containing drawstring plastic tape material, said sealing bar being non-rotative and having a first hollow end portion adapted to seal the folded hems and including first internally disposed means for heating said first end portion and a first control means for said heating means for providing a first temperature to said first end portion, a second hollow end portion comprising the remaining length of said sealing bar and including a second internally disposed means for heating said remaining length, and a second control means for providing a second lesser temperature to said remaining portion.

4,889,523

TEARABLE PACKAGE OF SYNTHETIC THERMOPLASTIC FOIL AND DEVICE AND METHOD FOR PRODUCING THE SAME

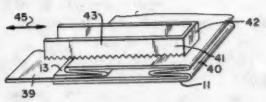
Karl-Heinz Sengewald, Postfach 1460, 4802 Halle in Westf. 1 DE, Fed. Rep. of Germany

Division of Ser. No. 897,843, Aug. 18, 1986, which is a continuation of Ser. No. 678,010, Nov. 30, 1984, abandoned. This application Feb. 24, 1988, Ser. No. 159,722

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1983, 3344332; Mar. 9, 1984, 3408722

Int. Cl.[4] B31B *23/22, 27/14, 23/86*

U.S. Cl. 493—195 2 Claims



1. A method of manufacturing a tearable package of synthetic thermoplastic film, comprising the steps of providing semi-hose having two longitudinal edges of which one of the longitudinal edges is initially closed and the other of the longitudinal edges is initially open, upper and lower walls and plural folds provided at each of said longitudinal edges and connecting said upper and lower walls; moving said semi-hose over a cutting support extending laterally through said open edge; cutting one of said upper and lower walls and said plural folds by a cutting tool by using a cutting tool having a first blade and a second blade extending transversely to said longitudinal edges and being interconnected at one end averted from said open edge by a third blade extending in parallel to said longitudinal edges, so that said one wall become longer than the other wall and said plural folds and forms a flap; and connecting said upper and lower walls with one another so as to form a bottom.

4,889,524

PORTABLE CENTRIFUGE APPARATUS

Claude Fell, Nyon, Switzerland; Etienne Pagés, Divonne, France, and Dominique Uhlmann, Nyon, Switzerland, assignors to Haemonetics Corporation, Braintree, Mass.

Filed Sep. 4, 1987, Ser. No. 93,366

Int. Cl.[4] B04B *7/06, 9/12*

U.S. Cl. 494—12 18 Claims

1. Centrifuge apparatus for processing biological fluids comprising:

a cylindrical stationary bucket having a closeable top opening and a transverse inner diameter D1;

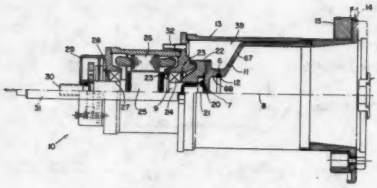
a centrifuge disposed within said bucket comprising:

(a) a bowl rotatable about a longitudinal axis and having a seamless integral bowl body with a main body portion of generally cylindrical shape and transverse outer diameter D2 and a lower projecting portion of smaller diameter than D2;

(b) a non-rotating head on said bowl providing a pathway

for entry and exit of fluid from said bowl while the bowl is rotating;

(c) a chuck for holding said bowl for rotation said chuck having a cylindrical upper portion of outer diameter D3 and inner diameter D4 conforming in shape to the shape of



the main body portion and wherein D1 minus D3 is very small and D4 minus D2 is likewise very small;

(d) a closeable cover over said bucket for holding the head of the bowl in a stationary position; and

(e) motor means for rotating said chuck and bowl within said bucket about the longitudinal axis.

4,889,525

SENSITIZATION OF HYPOXIC TUMOR CELLS AND CONTROL OF GROWTH THEREOF

John M. Yuhas, Bala Cynwyd; Robert L. Goodman, Gladwyne, both of Pa., and Robert E. Moore, Wilmington, Del., assignors to Adamantech, Inc., Linwood, Pa.

Continuation of Ser. No. 57,688, Jun. 2, 1987, abandoned, which is a continuation of Ser. No. 904,802, Sep. 8, 1986, abandoned, which is a continuation of Ser. No. 778,179, Sep. 20, 1985, abandoned, which is a continuation of Ser. No. 580,760, Feb. 17, 1984, abandoned, which is a continuation-in-part of Ser. No. 517,150, Jul. 25, 1983, abandoned, which is a continuation-in-part of Ser. No. 408,589, Aug. 17, 1982, abandoned. This application Jan. 11, 1988, Ser. No. 714,332

Int. Cl.[4] A61N *1/30*

U.S. Cl. 600—1 **72 Claims**

1. A method of controlling the growth of hypoxic tumor cells which comprises (a) sensitizing the cells to radiotherapy by contacting the cells with an aqueous dispersion of an oxygen carrying perfluoro compound and a dispersant for the perfluoro compound, and (b) irradiating the cells.

4,889,526

NON-INVASIVE METHOD AND APPARATUS FOR MODULATING BRAIN SIGNALS THROUGH AN EXTERNAL MAGNETIC OR ELECTRIC FIELD TO REDUCE PAIN

Elizabeth A. Rauscher, and William L. Van Bise, both of San Leandro, Calif., assignors to Magtech Laboratories, Inc., Reno, Nev.

Division of Ser. No. 775,100, Sep. 11, 1985, Pat. No. 4,723,536, which is a continuation-in-part of Ser. No. 644,148, Aug. 27, 1984, abandoned. This application Nov. 13, 1987, Ser. No. 120,914

Int. Cl.[4] A61N *1/42, 1/36;*

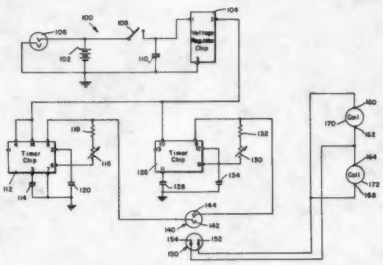
U.S. Cl. 600—14 **20 Claims**

1. A process for reducing pain in a human being comprising:

a. subjecting an area of the human being's body relating to the locus of the pain to a first cyclic expanding and collapsing magnetic field and a second cyclic expanding and collapsing magnetic field;

b. said first cyclic expanding and collapsing magnetic field comprising, and uncritically damped ringing square wave form to produce a Fourier series of harmonics having a fundamental frequency between 7 Hertz and 8 Hertz, a duty cycle of from about 15% to about 65%, and a field strength of at least 5.0 gauss;

c. said second cyclic expanding and collapsing magnetic field comprising, an uncritically damped ringing square wave form having a frequency about ten time the frequency of said first cyclic expanding and collapsing magnetic field to also produce a Fourier series of harmonics, a duty cycle of from about 15% to 50%, a field strength of at least 5.0 gauss, and operating simultaneously with said first cyclic expanding and collapsing magnetic field; and



d. matching said first cyclic expanding and collapsing magnetic field and said second cyclic expanding and collapsing magnetic field to each other so that a beat frequency is generated by the dynamic interaction of the two generated frequencies;

e. whereby the beat frequency causes the ion flow in the nervous system of the human body to be efficiently moved along the nerve path where the locus of the pain exists to thereby reduce the pain.

4,889,527

TWO-PIECE COUPLING DEVICE FOR FLUID EXCHANGE

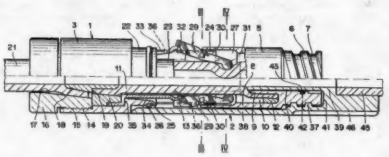
Peter Herrli, Biel, Switzerland, assignor to Contempo Products, P. Herrli, Biel, Switzerland

Filed Sep. 28, 1987, Ser. No. 101,726

Claims priority, application Switzerland, Sep. 29, 1986, 3890/86

Int. Cl.[4] A61M *1/06*

U.S. Cl. 604—29 **4 Claims**



1. A two-piece coupling device for the exchange of liquid or gaseous media, of the type having a detachably connectible first coupling part and second coupling part, each including a flow duct, and two tubes respectively connected to said coupling parts, wherein the improvement comprises:

a said first coupling part including a sleeve a longitudinal central passage and an axially projecting extension including at least one stepped portion, a jacket at least partially surrounding said extension, a first detachable fastening means, and a resilient hollow body secured at one end in said jacket,

automatic blocking means for preventing the flow of the media through said hollow body when said first coupling part is separated from said second coupling part,

a said second coupling part including a second detachable fastening means co-operating with said first detachable fastening means co-operating with said first detachable

fastening means and a hollow projection extending toward said first coupling part, said projection entirely surrounding said extension and partially surrounding said jacket;

said jacket including an axial prolongation, said first fastening means being an external thread on said prolongation, and said second fastening means being an internal thread with said second coupling part; and

the end of said hollow body remote from said jacket being secured in said sleeve, and said extension comprising first, second and third sections, said first section being directly adjacent to and smaller in diameter than said sleeve and including a circumferential groove and a sealing ring disposed in said groove, said second section being directly adjacent to and smaller in diameter than said first section, said third section being smaller in diameter than said first section, directly adjacent to and larger in diameter than said second section, and including two diametrically opposed axially and radially extending recesses, part of said automatic blocking means being disposed in said recesses.

4,889,528

DRIP INFUSION RATE CONTROL APPARATUS

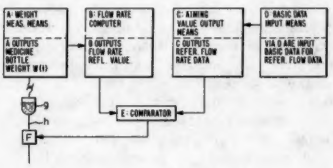
Tanekazu Nadai, 4-26 Minami Shinchi, Fushimi-ku, Kyoto, and Toshio Kawara, Uji, both of Japan, assignors to Shimadzu Corporation and Tanekazu Nadai, Osaka, Japan

Filed Feb. 29, 1988, Ser. No. 162,059

Claims priority, application Japan, Feb. 27, 1987, 62-046217; Aug. 3, 1987, 62-193996; Aug. 28, 1987, 62-215918; Aug. 28, 1987, 62-215919

Int. Cl.⁴ A61M *31/00*

U.S. Cl. 604—65 **8 Claims**


A: WEIGHT MEAS. MEANS
B: FLOW RATE COMPUTER
C: AIMING VALUE OUTPUT MEANS
D: BASIC DATA INPUT MEANS
A: OUTPUTS MEDICINE BOTTLE WEIGHT W(t)
B: OUTPUTS FLOW RATE REFL. VALUE
C: OUTPUTS REFER. FLOW RATE DATA
VIA D ARE INPUT BASIC DATA FOR REFER. FLOW DATA
E: COMPARATOR
F

1. A drip infusion rate control apparatus for controlling the flow rate of a medical solution to be infused into a human or animal body by means of a drip infusion system, said apparatus comprising:

a weight measuring means for measuring the weight of a medicine bottle containing a medical solution being infused into a human or animal body through an infusion tube led out from said medicine bottle;

an existing flow rate data computing means for computing, by using at least time-dependently varying weight data outputted from said weight measuring means, an existing flow rate reflecting value which reflects an existing flow rate of said medical solution flowing in said infusion tube;

an aiming value outputting means for outputting a set of reference flow rate data defining an aiming flow rate expected to said medical solution;

a basic data inputting means for inputting a set of basic data necessary for said aiming value outputting means to output said set of reference flow rate data;

a comparator for comparing said existing flow rate reflecting value with at least one of the reference flow rate data contained in said set of reference flow rate data, and outputting a flow rate control signal; and

a flow rate regulating mechanism interposed midway of said infusion tube, said mechanism being operative according to said flow rate control signal outputted from said comparator.

4,889,529

NEEDLE

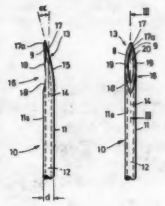
Hans Haindl, Melsungen, Fed. Rep. of Germany, assignor to B. Braun Melsungen AG, Melsungen, Fed. Rep. of Germany

Filed Jul. 1, 1988, Ser. No. 214,182

Claims priority, application Fed. Rep. of Germany, Jul. 10, 1987, 3722800

Int. Cl.⁴ A61M *5/32*

U.S. Cl. 604—274 **10 Claims**



1. A needle comprising:

a hollow, rigid needle tube having a longitudinal axis and including a front end, a first side wall and an opposite, axial side wall,

the axial side wall having an inner surface and an outer surface,

the first side wall being bent near the front end of the needle tube in a curve directed towards the opposite, axial side wall,

a lumen opening defined in the axial side wall at a region adjacent the curve of the first side wall and extending substantially parallel to the longitudinal axis of the needle tube,

the lumen opening having a front punctuating portion and a rear cutting edge arranged adjacent the inner surface of the axial side wall,

the front punctuating portion comprising a lancet-shaped tip having a facet grinding and being arranged in a zone between two imaginary lines extending respectively from the inner surface and the outer surface of the axial side wall beyond the rear cutting edge of the lumen opening.

4,889,530

WOUND DRESSING CONTAINING ACRYLATE OR METHACRYLATE HYDROGEL POLYMER

Daniel J. Smith, Stow, and Sanjay R. Patel, Akron, both of Ohio, assignors to University of Akron, Akron, Ohio

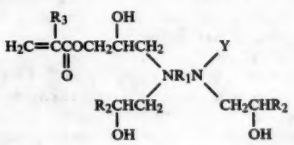
Division of Ser. No. 915,545, Oct. 6, 1986, Pat. No. 4,781,921. This application Jul. 22, 1988, Ser. No. 223,086

The portion of the term of this patent subsequent to Nov. 1, 2005, has been disclaimed.

Int. Cl.⁴ A61F *13/00*

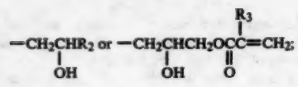
U.S. Cl. 604—304 **6 Claims**

1. A wound dressing containing, as a therapeutically active agent, a hydrogel comprising (a) a cross-linked polymer of a major amount of a compound of the formula (I)



(I)

wherein R_1 is a divalent hydrocarbon radical containing from 2 to about 6 carbon atoms; R_2 is hydrogen, methyl or ethyl; R_3 is hydrogen or methyl; and Y is



and (b) water.

4,889,531

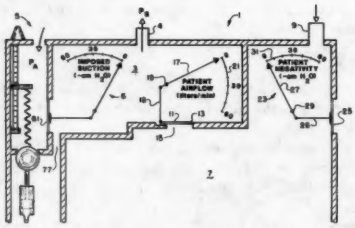
DRY BOTTLE DRAINAGE SYSTEM

Nicholas F. D'Antonio, and Nicholas J. D'Antonio, both of Liverpool, N.Y., assignors to Pfizer Hospital Products Group, Inc., New York, N.Y.

Continuation of Ser. No. 642,564, Aug. 20, 1984, Pat. No. 4,715,855. This application Aug. 6, 1987, Ser. No. 58,573

Int. Cl.[4] A61M *1/00*

U.S. Cl. 604—319 19 Claims



1. A system for draining fluids from a portion of the body, said system comprising:

collection means for receiving fluids from the body, said collection means including an inlet port for admitting fluids from the body to said collection means;

a suction chamber communicatable with said collection means, said suction chamber being connectable to a suction source of a suction pressure level;

a suction regulator for establishing a desired pressure in said suction chamber, said suction regulator including

a first compartment having a first chamber communicating with the atmosphere;

a second compartment having a second chamber communicating with said suction chamber and having an outlet for connecting said second compartment and the suction source;

first dividing means dividing said first chamber from said second chamber, said first dividing means including an opening for putting said second chamber in communication with said first chamber;

first closing means movable between an opening position for opening said opening to admit air at atmospheric pressure into said second chamber, and a closing position for closing said opening to prevent the passage of air at atmospheric pressure into said second chamber; and

biasing means for moving said closing means to the closed position when the pressure in said suction chamber exceeds said desired pressure to preferentially apply said suction pressure level to said suction chamber when the pressure in said suction chamber is greater than said desired pressure, and said closing means moving to said open position when the pressure in said suction chamber is less than said desired pressure.

4,889,532

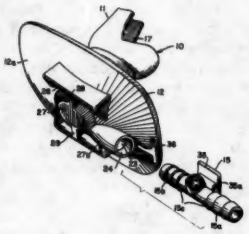
FEMALE URINARY INCONTINENCE DEVICE WITH FORWARDLY-DIRECTED DISCHARGE PASSAGE AND SUPPORT SURFACE PORTIONS

Michael Metz, Chicago; Joseph S. Tokarz, Palatine, and Marvin E. Jensen, Niles, all of Ill., assignors to Hollister Incorporated, Libertyville, Ill.

Filed Jun. 21, 1988, Ser. No. 209,541

Int. Cl.[4] A61F *5/44*

U.S. Cl. 604—330 17 Claims



1. A female urinary incontinence device having a periurethral cup of soft, compressible material having an upper opening defined by smoothly-rounded contact surfaces for engaging the periurethral floor and vaginal introitus of a wearer; said cup also having a lower opening; an external pad of soft, flexible, resilient material having an upper surface for externally contacting the labia majora of a wearer; said pad having an inlet in said upper surface and having a generally horizontal discharge passage extending there through along the sagittal midplane thereof; said discharge passage having a first end portion communicating with said inlet and a second end portion terminating in an outlet; a compressible tubular elastic bellows extending between said lower opening of said cup and said inlet of said pad; said pad having an undersurface with laterally-disposed support surface portions; said support surface portions being located on opposite sides of said sagittal midplane and extending below and generally parallel with said discharge passage; said undersurface also including a medial support surface portion disposed between said lateral surface portions and extending towards said outlet.

4,889,533

FEMALE URINARY COLLECTION DEVICES HAVING HOLLOW-WALLED FILLED URINE RECEPTACLES

William H. Beecher, 292 Boyd Ave., Elmhurst, Ill. 60126

Filed May 28, 1986, Ser. No. 868,292

Int. Cl.[4] A61F *5/44*

U.S. Cl. 604—330 35 Claims

1. A female urinary collection device, comprising

a generally cup-shaped receptacle for collecting urine from the urethra orifice of a female user,

said receptacle having a bottom wall portion and a generally annular side wall portion projecting generally upwardly therefrom and terminating in a soft rounded compliant generally annular lip portion for sealing engagement with the external vestibular tissues of the user immediately around the urethra orifice and between the labia majora lips of the user,

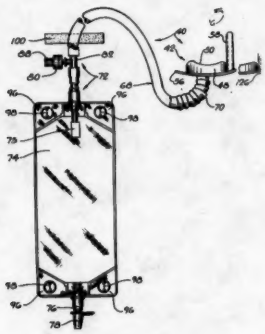
said side wall portion being of a size corresponding generally with the space between the labia majora lips of the user to fit comfortably between the labia majora lips,

and a drain tube portion connecting with the bottom wall portion for draining the urine out of the receptacle,

the side wall portion being hollow and comprising spaced inner and outer shells merging at their upper extremities to form said rounded lip portion,

the inner and outer shells being made of a soft thin highly flexible compliant synthetic elastomer material,

said side wall portion having a hollow space between substantially the entire extent of said inner and outer shells, said hollow space being filled with a viscous liquid synthetic elastomer material enabling said lip portion to conform



precisely with the exact contours of the vestibular tissues of the user immediately around the urethra orifice with a minimum of pressure between said lip portion and the vestibular tissues.

4,889,534

OSTOMY APPLIANCE WITH THREE-LEMENT COUPLING RING ASSEMBLY

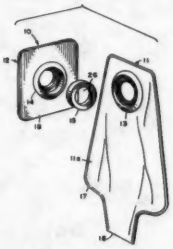
Mahmood Mohiuddin, Lake Zurich; Barry L. Schneider, Deerfield, and Paul O. Kay, Libertyville, all of Ill., assignors to Hollister Incorporated, Libertyville, Ill.

Continuation of Ser. No. 937,825, Dec. 4, 1986, abandoned. This application Aug. 23, 1988, Ser. No. 236,279

Int. Cl.[4] A61F 5/44

U.S. Cl. 604—339 **10 Claims**

1. An ostomy appliance comprising a collection pouch having a stoma opening therein; an adhesive faceplate having an aperture alignable with said stoma opening; and coupling means for detachably connecting said pouch and faceplate together; said means comprising a first latching ring secured to said pouch about said stoma opening; a second latching ring connected to said faceplate about said aperture; said latching rings being formed of flexible plastic material with one of said rings having an annular shoulder and the other of said rings having a radially-deflectable lip for radially-directed latching engagement with said shoulder when said rings are urged axially together; said lip including a radially-inwardly projecting latching rim; said rim extending behind said shoulder when said latching rings are coupled together to prevent axial separation of said latching rings in the absence of radially-outward



deflection of said lip; said latching rings also having axially-aligned openings therethrough and having opposing wall portions extending along planes generally normal to the axes of said aligned openings; said opposing wall portions being spaced axially apart to define an annular chamber therebetween when said latching rings are coupled together; and a sealing ring of soft, deformable, resilient material disposed within said annular chamber in sealing engagement with both of said opposing wall portions, and in a state of axial compression, when said latching rings are coupled together; said opposing wall portions being provided with at least one annular rib projecting axially into said chamber for sealingly engaging and deforming said sealing ring.

4,889,535

4-SUBSTITUTED BENZOTHIAZOL-2-YLAZO-N-C8-14-ALKYKL-N-(2'-CYANOETHYL)ANILINES OPTIONALLY HAVING A 3-C1-4-ALKYL GROUP

Beat Henzi, Basle, Switzerland, assignor to Sandoz Ltd., Basle, Switzerland

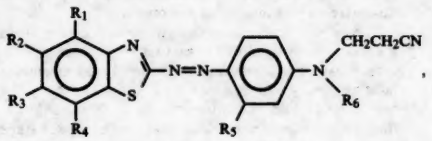
Continuation-in-part of Ser. No. 839,854, Mar. 14, 1986, abandoned. This application Mar. 13, 1987, Ser. No. 25,318

Claims priority, application Fed. Rep. of Germany, Mar. 18, 1985, 3509651; Dec. 19, 1985, 3544917

Int. Cl.[4] C09B *29/045, 29/085, 67/22;* D06P *1/18*

U.S. Cl. 8—639 19 Claims

1. A compound of the formula



or a mixture thereof, wherein

R_1 is hydrogen, chloro or bromo,

R_2 is hydrogen, chloro, bromo or nitro,

R_3 is hydrogen, chloro or bromo,

R_4 is hydrogen, chloro or bromo,

R_5 is hydrogen or C_{1-4}alkyl, and

R_6 is C_{10-14}alkyl,

with provisos that (i) at least one of R_1, R_2, R_3 and R_4 is other than hydrogen, and (ii) when two or more of R_1, R_2, R_3 and R_4 are halo, then R_3 is one of those halos.

4,889,536

ROLL TYPE SOLID ELECTROLYTE CAPACITOR

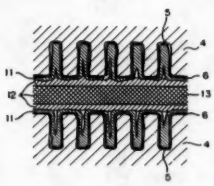
Kazumi Naitoh; Yoshiaki Arakawa, both of Yokohama; Takashi Ikezaki, Atsugi; Shoji Yabe, Kawasaki; Yutaka Yokoyama, Fussa; Yuichi Hamaguchi; Yasunobu Roppongi, both of Oume, all of Japan, and Yuichi Hamaguchi, assignors to Showa Denko Kabushiki Kaisha and Nippon Chemi-Con Corporation, Tokyo, Japan

Continuation of Ser. No. 131,493, Dec. 10, 1987, which is a division of Ser. No. 51,787, May 20, 1987, abandoned. This application Jun. 27, 1989, Ser. No. 372,174

Claims priority, application Japan, May 20, 1986, 61-113521; May 20, 1986, 61-113538; May 21, 1986, 61-114935; May 22, 1986, 61-116087; Jul. 16, 1986, 61-167146; Jul. 21, 1986, 61-171059; Dec. 27, 1986, 61-313405; Dec. 27, 1986, 61-310686; Dec. 27, 1986, 61-310688

Int. Cl.[4] B65H *81/00;* H01G *9/05*

U.S. Cl. 29—570.1 28 Claims



1. A process for the preparation of a roll type solid electrolytic capacitor, which comprises the step of forming a semiconductor layer on the entire surface of a dielectric oxide layer of a sheet-form valve metal positive electrode substrate having said dielectric oxide layer on the surface thereof, the step of forming an electroconductive layer on the entire surface of the thus-formed semiconductor layer, and the step of winding the sheet-form valve metal positive electrode substrate into the form of a roll; said step of winding the substrate into the roll form being placed (i) before the step of forming the semiconductor layer, (ii) between the step of forming the semiconductor layer and the step of forming the electroconductive layer, or (iii) after the step of forming the electroconductive layer.

4,889,537

METHOD FOR TREATING A FUEL COMPRISING A MIXTURE OF HYDROCARBONS AND ALCOHOLS, AND A SELECTIVE WATER-ADSORPTION PRODUCT

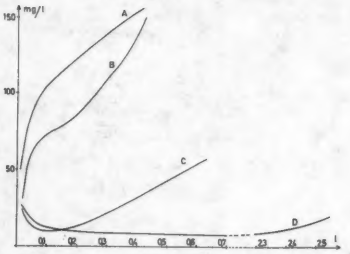
Yves Aurelle, Aucamville; Christian Bernasconi, Vernaison; Jean Besombes-Vailhe, Toulouse; Edmond Julien, Saint Jean, and Henri Roques, Portet Sur Garonne, all of France, assignors to ELF FRANCE Societe Anonyme, Paris, France

Filed May 12, 1986, Ser. No. 861,971

Claims priority, application France, May 10, 1985, 85 07650

Int. Cl.[4] C10L *1/02*

U.S. Cl. 44—53 16 Claims



1. A method for treating a fuel which comprises a mixture of hydrocarbon(s) and alcohol(s) for stabilizing the homogeneity of said mixture at its lowest temperature of operation, said method comprising placing said mixture in contact with at least one cationic ion exchange resin prepared in the form of an alkali metal or alkaline earth metal salt and capable of strongly dissociating into ion form in an aqueous medium for absorbing at least a portion of any water dissolved in said mixture and for limiting the water content of said mixture to a value less than the segregation threshold of said mixture at the lowest operational temperature.

4,889,538

COAL AGGLOMERATION BENEFICIATION WITH HEAVY HYDROCARBON OILS AND UTILIZATION THEREOF IN COAL/HEAVY OIL COPROCESSING

Josef A. Mikhlin, deceased, late of Montreal, Canada (by Fira Mikhlin, legal representative); Michio Ikura, Kanata, Canada; James F. Kelly, Nepean, Canada, and C. Edward Capes, Ottawa, Canada, assignors to Minister of Energy, Mines and Resources Canada, Canada

Filed Jul. 14, 1988, Ser. No. 219,444

Int. Cl.[4] C10L *5/00*

U.S. Cl. 44—90 7 Claims

1. A process for agglomerating coal fines which comprises mixing a pitch-like petroleum oil residue containing at least 50% by weight of a material which boils above 525° C. with an aqueous slurry of said coal fines to form agglomerates of said coal fines, the mixing being carried out at an elevated temperature sufficient to lower the viscosity of said pitch-like petroleum oil residue to a level permitting easy mixing and at an elevated pressure sufficiently high to prevent boiling of the water at the mixing temperature.

6. A process according to claim 1 wherein the agglomerated product is separated from the remaining liquid containing ash or mineral matter.

7. A process according to claim 6 wherein the agglomerated product comprising coal and undiluted pitch-like petroleum oil

residue is mixed with additional heavy oil or bitumen to form a feedstock which is then subjected to oil/coal coprocessing.

4,889,539

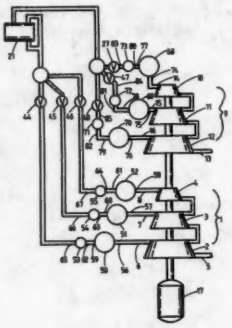
STEADY WORK OUTPUT RATE APPARATUS FOR CYCLIC SOLID WITH GAS REACTORS

Joseph C. Firey, P.O. Box 15514, Seattle, Wash. 98115-0514

Continuation-in-part of Ser. No. 279,785, Dec. 5, 1988, abandoned. This application May 9, 1989, Ser. No. 349,526

Int. Cl.[4] C10J *3/00, 3/22*

U.S. Cl. 48—61 **3 Claims**



1. In a cyclic gas with solid reaction plant comprising a separate compressor means comprising at least one stage; drive means for driving said compressor; a separate expander means comprising at least one stage; a number of containers at least equal to the sum of the number of compressor stages plus the number of expander stages, each said container comprising at least one reaction chamber; each compressor stage comprising an outlet pipe for gases being compressed therein; each expander stage comprising an inlet pipe for reacted gases to be expanded therein; separate changeable gas flow connections between each said container and each said outlet of each said compressor stage and each said inlet of each said expander stage;

wherein the improvement comprises:

a number of separate means for holding steady the discharge pressure from the outlet of each said compressor stage of said cyclic gas with solid reaction plant, said number of separate means for holding discharge pressure steady being equal to the number of said compressor stages, each said means for holding steady discharge pressure comprising:

tank means for containing gas at high pressure comprising a tank inlet and a tank outlet;

means for regulating back pressure of flowing gas comprising a back pressure regulator inlet and a back pressure regulator outlet;

fixed open gas flow connections from said tank means outlet to said back pressure regulator inlet of said means for regulating back pressure;

several means for interconnecting one of said means for holding steady discharge pressure between the outlet pipe of one stage of said compressor and those changeable gas flow connections to which that one compressor stage delivers compressed gas, so that all compressed gas from that one compressor stage flows first into said tank means for containing, second into said means for regulating back pressure and third to that changeable gas flow connection which is currently open, each said compressor stage being thusly fitted with one of said means for interconnecting and said means for holding steady discharge pressure;

said means for interconnecting comprising: a fixed open gas flow connection form said compressor outlet to said tank inlet; a fixed open gas flow connection from said back pressure regulator outlet to said changeable gas flow connections to which that one compressor stage delivers compressed gas;

a number of separate means for holding steady the inlet pressure to the inlet of each said expander stage of said cyclic gas with solid reaction plant, said number of separate means for holding inlet pressure steady being equal to the number of said expander stages, each said means for holding steady inlet pressure comprising:

tank means for containing gas at high pressure comprising a tank inlet and a tank outlet;

means for regulating downstream pressure of flowing gas comprising a downstream pressure regulator inlet and a downstream pressure regulator outlet;

fixed open gas flow connection from said downstream pressure regulator outlet to said tank means inlet;

several means for interconnecting one of said means for holding steady inlet pressure between the inlet pipe of one stage of said expander and those changeable gas flow connections from which that one expander stage receives reacted gas, so that all reacted gas going to that one expander stage flows first from that changeable gas flow connection which is currently open, second into said means for regulating downstream pressure, third into said tank means for containing, and fourth into said inlet pipe of said one expander stage, each said expander stage being thusly fitted with one of said means for interconnecting and said means for holding steady inlet pressure;

said means for interconnecting comprising: a fixed open gas flow connection from said expander inlet to a said tank outlet; a fixed open gas flow connection form said downstream pressure regulator inlet to said changeable gas flow connections from which that one expander stage receives reacted gas.

4,889,540

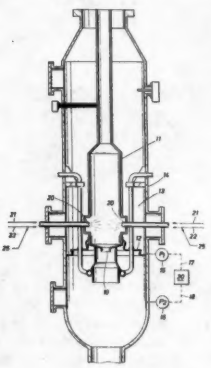
APPARATUS FOR DETERMINATION OF SLAG TAP BLOCKAGE

Clifford C. Segerstrom, Houston, Tex.; Jacob H. Stil; Pieter J. Schuurman, both of The Hague, Netherlands, and Günter K. Eckstein, Hamburg, Fed. Rep. of Germany, assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 112,307, Oct. 26, 1987, Pat. No. 4,834,778. This application May 23, 1989, Ser. No. 356,905

Int. Cl.[4] C10J *3/48*

U.S. Cl. 48—77 **4 Claims**



1. An apparatus for preventing blockage of a slag tap in a coal gasification reactor contained within a pressure vessel

whereby a pressurized annulus is formed between said reactor and said pressure vessel, said apparatus comprising:

a diaphragm fixedly and sealingly attached between the outer walls of said gasifier and the inner walls of said pressure vessel thereby dividing said pressurized annulus into an upper and a lower pressurized annulus, said lower pressurized annulus being in open communication with said reactor downstream of said slag tap;

a pressure transducer for measuring the pressure within said upper pressurized annulus;

a pressure transducer for measuring the pressure within said lower pressurized annulus;

means for determining the pressure difference between said pressure transducers; and

means, responsive to said differential pressure-determining means, for adjusting the operating conditions of said reactor.

4,889,541

SEPARATION OF GASES

Richard F. Beaupre, Darien, Conn., assignor to Texaco Inc., White Plains, N.Y.

Filed Jul. 5, 1988, Ser. No. 214,985
Int. Cl.[4] B01D *53/22, 19/00*
U.S. Cl. 55—16 **9 Claims**

1. The method of separating a gas from a rich charge liquid containing an acid gas which comprises

maintaining in a description unit a separating layer membrane selected from the group consisting of (i) a membrane of cast vinyl alcohol which has been cross-linked with an aliphatic polyaldehyde containing at least three carbon atoms including those in said aldehyde groups and (ii) a membrane of silicone or of silicone-polycarbonate said membrane having a high pressure charge side and a low pressure discharge side;

passing into contact with the high pressure charge side of said membrane a rich charge liquid containing gas;

maintaining a pressure on the charge side of said membrane in excess of the pressure on the low pressure discharge side of said membrane, whereby at least a portion of said gas in said rich charge liquid passes through said membrane as permeate and said rich charge liquid is converted to a lean liquid retentate containing less gas than is present in said rich charge liquid;

recovering from the low pressure discharge side of said membrane said permeate gas; and

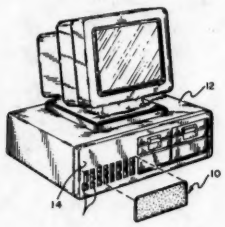
recovering from the high pressure charge side of said membrane said lean liquid retentate containing less gas than is present in said rich charge liquid.

4,889,542

COMPUTER AIR FILTER DEVICE AND METHOD

William J. Hayes, 31 Black Horse Pike, Collings Lake, N.J. 08094

Filed Nov. 14, 1988, Ser. No. 270,203
Int. Cl.[4] B01D *46/02*
U.S. Cl. 55—97 **21 Claims**



17. A method of maintaining internal cleanliness in a computer apparatus that comprises a heat generating electronic mechanism in a housing with and air intake opening through the housing, the opening positioned to draw air into the housing by a draft from a fan means in the housing, the method comprising:

(A) providing a foam filtration panel comprising:

(i) an inside surface and an outer surface, the panel being of a size and shape sufficient to entirely cover the intake opening, and

(ii) adhesive means permanently adhered to the inside surface along lengthwise edges of the foam panel to provide a removable contact adhesive surface,

wherein the foam panel:

(a) is porous and permeable reticulated flexible polymeric foam having three-dimensional skeletal strands,

(b) has a pore size in the range of about 40 to about 90 pores per lineal inch, and

(c) has a thickness in the range of about 3/16 inch to about 5/16 inch, and

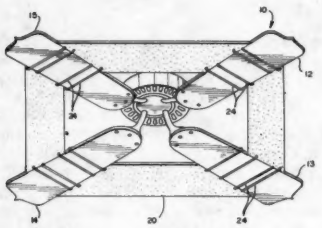
(B) adhesively adhering the contact adhesive surface of the foam panel to an outside surface of the computer housing and positioning the panel to cover the air intake opening sufficiently to require essentially all air flow into the intake opening to pass through the foam panel.

4,889,543

AIR FILTERING SYSTEM

Jerry D. Burt, 2132 Harrell Dr., Oxford, Ala. 36203

Filed Dec. 8, 1988, Ser. No. 281,167
Int. Cl.[4] B01D *46/10;* **F03D** *11/00*
U.S. Cl. 55—97 **7 Claims**



1. A method for filtering the air in a room equipped with a fan having rotatable blades extending radially from an axial point and spaced apart circumferentially, comprising the steps of:

provision of filtering elements, each positioned between two adjacent circumferentially spaced apart blades;

interconnecting each of said filtering elements along one of opposite sides thereof to respective adjacent blades of the fan by fastening means, whereby movement of the blades with the filtering elements therebetween causes the filtering elements to attract and remove pollution from the room air.

4,889,544

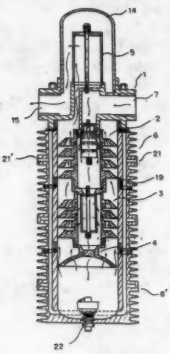
COOLER-DEHUMIDIFIER-FILTER 3-IN-ONE APPARATUS FOR TREATING COMPRESSED AIR

Chia-Tsong Hsu, No. 424-2, Sec. 1, Chungshan Road, Changhua, Taiwan

Filed Jan. 9, 1989, Ser. No. 729,467
Int. Cl.[4] B01D *45/16*
U.S. Cl. 55—218 **4 Claims**

1. A cooler-dehumidifier-filter 3-in-one apparatus for treating compressed air comprising an air inlet-outlet mechanism, an air diffusion mechanism, an air filtering mechanism, an air exhausting device, an air filtering cylinder and a plurality of

radiator cisterns, wherein said radiator cisterns are vertically connected with one another and set below said air inlet-outlet mechanism, having a centrally disposed bore hole to communicate with one another, the first bottom cistern having an enclosed bottom end and a centrally disposed automatic drain valve on the bottom for drainge of water; said air filtering cylinder being secured with said air inlet-outlet mechanism at the bottom there of and being covered with a glass hood to induce filtrated air from said air filtering cylinder toward the air outlet of said air inlet-outlet mechanism; said air diffusion mechanism, air filtering mechanism and an exhausting device being downwardly connected together in proper order by means of series connection to form an assembly, said assembly being further set in the centrally disposed hollow space of said



radiator cisterns and attached to the bottom end of an air intake conduit of said air inlet-outlet mechanism by means of said diffusion mechanism through screw joint; said apparatus being characterized in that a double-cooling effect is achieved by means of the double-squeezing and diffusing process through the arrangement of a plurality of air induction slots made in said air diffusion mechanism and a plurality of interlocking holes made on the flanges of the radiator fins of said air filtering mechanism; an air dehumidifying effect being achieved by means of the formation of spiral air flow through the arrangement of a spiral groove made on the water wall of said exhausting device; a water cooling effect being achieved by means of the arrangement of comunicating pipe formed among said radiator cisterns matching with its water inlet and water outlet.

4,889,545

HYDROCARBON GAS PROCESSING

Roy E. Campbell; John D. Wilkinson, and Hank M. Hudson, all of Midland, Tex., assignors to Elcor Corporation, Midland, Tex.

Filed Nov. 21, 1988, Ser. No. 275,102
Int. Cl.[4] F25J *3/02*
U.S. Cl. 62—24 **72 Claims**

1. In a process for the separation of a gas containing methane, C_2 components, C_3 components and heavier hydrocarbon components into a volatile residue gas fraction containing a major portion of said methane and a relatively less volatile fraction containing a major portion of said C_2 components, C_3 components and heavier components, in which process

(a) said gas is cooled under pressure to provide a cooled stream;

(b) said cooled stream is expanded to a lower pressure whereby it is further cooled; and

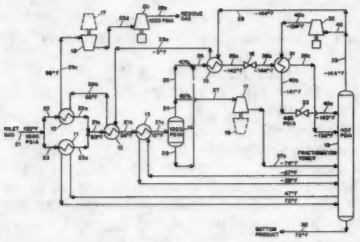
(c) said further cooled stream is fractionated at said lower pressure whereby the major portion of said C_2 components, C_3 components and heavier hydrocarbon components is recovered in said relatively less volatile reaction; the improvement wherein said gas is cooled sufficiently to partially condense it; and

(1) said partially condensed gas is separated thereby to provide a vapor stream and a condensed stream;

(2) said vapor stream is thereafter divided into gaseous first and second streams;

(3) said gaseous first stream is combined with at least a portion of said condensed stream to form a combined stream and said combined stream is cooled to condense substantially all of it and is thereafter expanded to said lower pressure whereby it is further cooled;

(4) the expanded cooled combined stream is then directed in heat exchange relation with a warmer compressed recycle portion of a distillation stream which rises in a fractionation tower; the distillation stream is withdrawn from an upper region of said tower and is thereafter divided into said volatile residue gas fraction and said recycle stream;



(5) said combined stream is thereafter supplied at a first mid-column feed position to a distillation column in a lower region of the fractionation tower;

(6) said compressed recycle stream is cooled by said expanded cooled stream sufficiently to substantially condense it;

(7) said substantially condensed compressed recycle stream is expanded to said lower pressure and supplied to said fractionation tower at a top feed position;

(8) said gaseous second stream is expanded to said lower pressure and is supplied to said distillation column at a second mid-column feed position; and

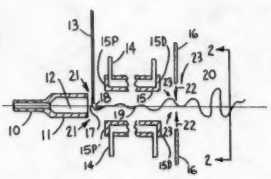
(9) the pressure of said compressed recycle stream and the quantities and temperatures of said feeds to the column are effective to maintain tower overhead temperature at a temperature whereby the major portion of said C_2 components, C_3 components and heavier hydrocarbon components is recovered in said relatively less volatile fraction.

4,889,546

METHOD AND APPARATUS FOR FORMING FIBERS FROM THERMOPLASTIC MATERIALS

Donald W. Denniston, 4412 S.W. 85th Way, Gainesville, Fla. 32608

Continuation-in-part of Ser. No. 198,399, May 25, 1988, Pat. No. 4,861,362. This application May 12, 1989, Ser. No. 350,933
Int. Cl.[4] C03B *37/06, 37/04*
U.S. Cl. 65—5 **20 Claims**



1. A method of attenuating glass fibers comprising produc-

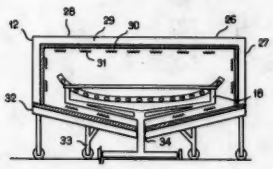
ing a primary, high temperature, high velocity gaseous blast along a primary axis, introducing a plurality of primary glass fibers into said blast so that said glass moves with and is attenuated into fibers by said primary blast, delivering from a row of thin hollow tubes located to one side only of said primary blast a plurality of closely spaced, thin, high speed jets of fuel and oxidant at speeds sufficiently higher than the speed of said primary blast toward said primary blast to penetrate essentially normal to said primary blast at a minimum distance two inches downstream from the location where said primary glass fibers are introduced into said primary blast and wherein said primary blast is at an elevated temperature sufficient to attenuate said glass fibers, but at a total mass rate of flow of jets less than the mass rate of flow of said primary blast, whereby said impinging jets cause local increased turbulent flow of said fibers within said primary blast and said fuel oxidizes in said primary blast to maintain the temperature of said primary blast above a minimum temperature at which said glass attenuates.

4,889,547

APPARATUS FOR THERMAL BENDING OF GLASS SHEETS

Jean Lecourt, Paris, France; Desire Legros, Jemeppe/Sambre, and Andre Granville, Auvelais, both of Belgium, assignors to Saint-Gobain Vitrage "Les Miroirs" , Courbevoie, France

Filed Nov. 18, 1988, Ser. No. 273,014
Claims priority, application France, Nov. 20, 1987, 87 16083
Int. Cl.[4] C03B *23/025*
U.S. Cl. 65—107 **5 Claims**



1. An apparatus for thermal bending of glass sheets by gravity, said apparatus comprising:

(a) a mobile system for carrying the glass sheets and transporting the glass sheets in a furnace comprising at least one preheating cell and at least one bending cell, from one cell to another;

(b) a plurality of electrical resistors placed on an inside surface of the walls of the furnace for providing heating, wherein:

(c) said mobile system comprises carriages each having a cradle that supports the glass sheets and moves in a hot part of the furnace and rolling means connected mechanically to said cradle that remains outside the furnace;

(d) said rolling means are positioned below said cradle of each of said carriages;

(e) said cradle and said rolling means of each of said carriages are connected mechanically by a rigid connection the thickness of which in a direction perpendicular to the direction of advance of the carriages is limited to that which is necessary to assure the rigidity of the mobile system;

(f) said rigid connections is positioned in a longitudinal slit provided in a floor of the furnace;

(g) said floor comprises two parts, one of which is located on each side of said longitudinal slit; and

(h) said rolling means includes means for movement in an at least approximately horizontal plane.

4,889,548

USE OF AN OXIDE CERAMIC MATERIAL FOR COMPRESSION MOLDS FOR SHAPING ELEMENTS MADE FROM GLASS OR A GLASS-CONTAINING CERAMIC AND HAVING HIGH SURFACE QUALITY AND DIMENSIONAL ACCURACY

Jochen Kriegesmann, Hoehr-Grenzhausen; Henning Franek, Braunfels-Tiefenboch, and Waldemar Bluethgen, Braunfels, all of Fed. Rep. of Germany, assignors to Ernst Leitz Wetzlar GmbH, Wetzlar, Fed. Rep. of Germany

PCT No. PCT/DE87/00112, § 371 Date Jan. 6, 1988, § 102(e) Date Jan. 6, 1988, PCT Pub. No. WO87/05594, PCT Pub. Date Sep. 24, 1987
PCT Filed Mar. 17, 1987, Ser. No. 155,725
Claims priority, application Fed. Rep. of Germany, Mar. 17, 1986, 3608854
Int. Cl.[4] C03B *11/08*
U.S. Cl. 65—305 **19 Claims**

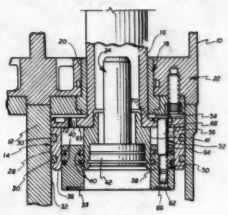
1. The use of an oxide ceramic material for compression molds for shaping elements made from glass or a glass-containing ceramic and having high quality and dimensional accuracy, wherein the material is present in polycrystalline form and the matrix component thereof comprises a ceramic made from one of a cubic and/or tetragonal HfO_2 or ($Zr,Hf(O_2$ mixed crystal phase.

4,889,549

PLUNGER OPERATING MECHANISM FOR A GLASS FORMING MACHINE

Albert J. Trahan, Vernon, and Robert J. Douglas, North Granby, both of Conn., assignors to Emhart Industries, Inc., Farmington, Conn.

Filed Apr. 13, 1989, Ser. No. 337,510
Int. Cl.[4] C03B *11/06*
U.S. Cl. 65—314 **2 Claims**



1. A plunger operating mechanism for a section of an individual section glass container forming machine comprising an upper cylinder having a base secured to a lower cylinder, said lower cylinder including

a cylindrical inner surface,

a first piston axially slideably displaceable along said cylindrical inner surface,

an axially extending rod integral with said first piston and projecting into said upper cylinder through an opening defined in the base of the upper cylinder for connection with a plunger assembly,

said first piston including

a bottom having an annular axially extending groove therein,

an annular second piston located within said groove,

a plurality of concentric axial hole means extending through said first and second pistons,

a corresponding plurality of stop pin means, wherein each stop pin of said plurality of stop pins is secured within a respective one of said axial hole means in said second piston and project upwardly through said plurality of hole means in said first piston for engaging the base of said upper cylinder when said rod is a selected distance from a fully advanced position, each of said stop pin

means having a top with an enlarged head portion so that said second piston cannot be removed from said first piston.

4,889,550

HERBICIDAL SULFONAMIDES

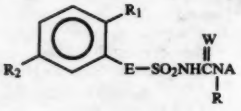
Steven P. Artz, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 108,646, Oct. 15, 1987, Pat. No. 4,786,314, which is a continuation-in-part of Ser. No. 41,790, Apr. 23, 1987, abandoned, which is a division of Ser. No. 860,229, May 12, 1986, Pat. No. 4,678,498, which is a continuation-in-part of Ser. No. 743,955, Jun. 12, 1985, abandoned. This application Sep. 1, 1988, Ser. No. 239,219

Int. Cl.[4] A01N *43/66*; C07F *9/65*; C07D *251/22, 251/16*

U.S. Cl. 71—86 **18 Claims**

1. A compound of the formula:



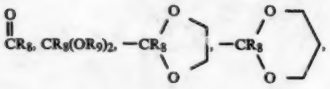
wherein

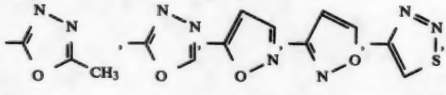
E is CH_2 or a single bond;

W is O;

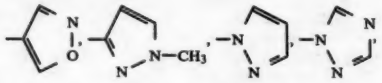
R is H or CH_3;

R_1 is F, Cl, Br, NO_2, C_1–C_4 alkyl, C_2–C_4 alkenyl, C_2–C_4 haloalkenyl, C_2–C_4 alkynyl, C_1–C_4 haloalkyl, C_1–C_4 alkoxy, $OCH_2CH_2OCH_3$, C_1–C_4 haloalkoxy, C_3–C_4 alkenyloxy, C_2–C_4 haloalkenyloxy, C_3–C_4 alkynyloxy, CO_2R_3, $CONR_4R_5$, $SO_4NR_4R_5$, $SO_2(OCH_3)CH_3$, $S(O)_nR_6$, OSO_2R_7, C_1–C_2 alkyl substituted with C_1–C_2 alkoxy, OH or C_1–C_2 alkylthio, CH_2CN, C_6H_5,

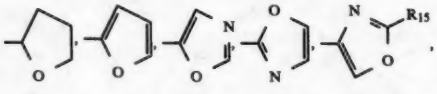




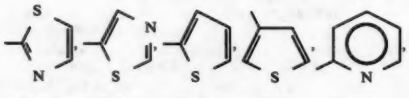
R_1-A R_1-B R_1-C R_1-D R_1-E



R_1-F R_1-G R_1-H R_1-I

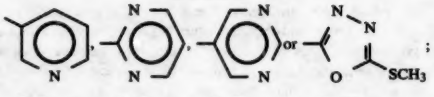


R_1-J R_1-K R_1-L R_1-M R_1-N



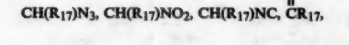
R_1-O R_1-P R_1-Q R_1-R R_1-S

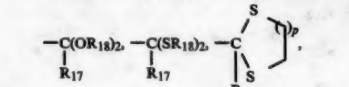
-continued

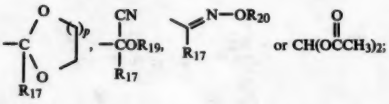


R_1-T R_1-U R_1-V R_1-W

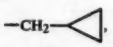
R_2 is $CH(R_{16})CN$, $CH(R_{17})SCN$,







R_3 is C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl,



CH_2CH_2Cl, CH_2CH_2F, or C_1–C_2 alkyl substituted with OCH_3 or SCH_3;

R_4 is C_1–C_3 alkyl;

R_5 is H or C_1–C_3 alkyl;

R_4 and R_5 may be taken together to form $(CH_2)_3$ or $(CH_2)_4$;

R_6 is C_1–C_3 alkyl, $CH_2CH{=}CH_2$ or $CH_2C{\equiv}CH$;

R_7 is C_1–C_3 alkyl or $N(CH_3)_2$;

R_8 is H, C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, CH_2CH_2Cl, CH_2CH_2F, C_1–C_2 alkyl substituted with OCH_3 or SCH_3 or C_3–C_6 cycloalkyl;

R_9 is C_1–C_2 alkyl;

R_{10} and R_{11} are independently C_1–C_2 alkyl, C_1–C_2 alkoxy, C_1–C_2 alkylthio, $NHCH_3$ or $N(CH_3)_2$;

R_{12} and R_{13} are independently H or C_1–C_2 alkyl;

R_{14} is C_1–C_3 alkyl;

R_{15} is H or CH_3;

R_{16} is H, C_1–C_2 alkyl or F;

R_{17} is H or C_1–C_2 alkyl;

R_{18} is C_1–C_2 alkyl;

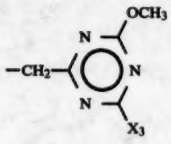
R_{19} is H, $Si(CH_3)_3$ or C_1–C_2 alkyl;

R_{20} is H or C_1–C_2 alkyl;

p is 1 or 2;

n is 0, 1, or 2;

A is



A-6

X_3 is CH_3 or OCH_3;

and their agriculturally suitable salts; provided that

(1) when R_2 is $C(O)R_{17}$, then R_1 is other than C_1–C_4 haloalkyl or C_2 alkyl substituted with C_1–C_2 alkoxy, OH or C_1–C_2 alkylthio; and

(2) when R_2 is $C(O)R_{17}$ then R_1 is other than $SO_2NR_4R_5$ and $SO_2N(OCH_3)CH_3$.

13. A method of controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim 1.

4,889,551

ISOXAZOLINE DERIVATIVES AND PLANT GROWTH REGULATORS

Kengo Oda, Hiratsuka; Tsutomu Ishii, Yokohama; Yukiharu Fukushi, Yokohama; Yuji Enomoto, Yokohama; Makoto Nishida, Yokohama, and Yoshikata Hojo, Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

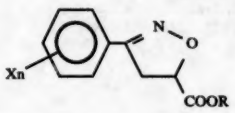
Filed Sep. 2, 1987, Ser. No. 92,197

Claims priority, application Japan, Oct. 29, 1985, 60-240666

Int. Cl.[4] C07D *261/04;* A01N *43/80*

U.S. Cl. 71—88 8 Claims

1. A 3-substituted phenyl-2-isoxazoline-5-carboxylic acid or an ester thereof having formula (I):



(I)

wherein n is 1 and X is a lower haloalkoxy group or n is 2 and X is the same or different halogen atoms, one of which is at the 4-position, and R is a hydrogen atom or a lower alkyl group.

4,889,552

2-PHENOXYPYRIMIDINE DERIVATIVE AND HERBIDICAL COMPOSITION

Nobuhide Wada; Yoshihiro Saito, both of Shizuoka; Shoji Kusano, Hamamatsu; Yasufumi Toyokawa; Takeshige Miyazawa, both of Shizuoka, and Satoru Takahashi, Shizuoka, all of Japan, assignors to Kumiai Chemical Industry Co., Ltd. and Ihara Chemical Industry Co., Ltd., both of Tokyo, Japan

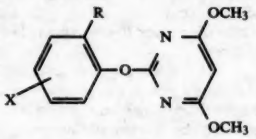
Filed Apr. 13, 1988, Ser. No. 181,366

Claims priority, application Japan, Apr. 14, 1987, 62-091787; Apr. 14, 1988, 63-091788

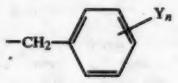
Int. Cl.[4] A01N *43/54;* C07D *239/60*

U.S. Cl. 71—92 16 Claims

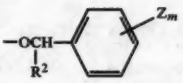
1. A 2-phenoxypyrimidine derivative having the formula:



wherein R is a formyl group or —$COOR^1$, wherein R^1 is a hydrogen atom, a lower alkyl group, a 2-methylsulfonylethyl group, a diethoxypropyl group, a lower alkenyl group, a lower alkynyl group, a lower haloalkyl group, a lower haloalkenyl group, a lower alkoxyalkyl group, a lower hydroxyalkyl group, a C_3–C_6-cycloalkyl group, a phenyl group or a group of the formula:



wherein Y is a halogen atom, a methyl group or a methoxy group and n is 0, 1 or 2; and X is a lower alkynyloxy group, a lower alkenyloxy group, a lower alkylthio group, a lower alkoxyalkyloxy group, a lower haloalkoxy group, an acetyloxy group, a benzoyloxy group, a trifluoromethyl group, a lower alkoxycarbonyl group, a lower dialkylamino group, a dimethoxymethyl group, or a group of the formula:



wherein R^2 is hydrogen atom or a methyl group, Z is a chlorine atom or a lower alkyl group and m is 0, 1, or 2, or

wherein R^3 is a lower alkyl group or a phenyl group; or X forms a methylenedioxy group attached to the adjacent carbon atoms.

10. A herbicidal composition comprising a herbicidally effective amount of a 2-phenoxypyrimidine derivative as defined in claim 1 and an agricultural adjuvant.

4,889,553

HERBICIDES

Graham P. Rowson, Hundon; John C. Head, Bishops Stortford, both of England; Jurgen Westermann; Martin Kruger, both of Berlin, Fed. Rep. of Germany; Friedrich Arndt, Berlin, Fed. Rep. of Germany, and Richard Rees, Berlin, Fed. Rep. of Germany, assignors to Schering Agrochemicals, United Kingdom

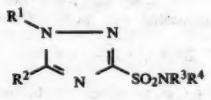
Filed May 15, 1987, Ser. No. 50,733

Claims priority, application United Kingdom, May 17, 1966, 12062; Dec. 12, 1986, 3643021; Mar. 5, 1987, 3707202; Mar. 12, 1987, 3708215

Int. Cl.[4] A01N *43/653;* C07D *249/12, 249/14, 401/04, 403/04, 417/04*

U.S. Cl. 71—92 18 Claims

1. A compound selected from the group consisting of the triazole sulphonamides of the formula:



(I)

or a salt thereof, where:

R^1 represents phenyl (unsubstituted or substituted by halogen or alkyl or alkoxy of 1 to 4 carbon atoms) or monocyclic nitrogen-carbon heterocyclyl selected from the group consisting of pyrimidinyl, triazinyl, thiadiazolyl, pyrazinyl and pyridinyl (unsubstituted or substituted by alkyl, alkoxy or alkylthio of 1 to 4 carbon atoms, cyano, halogen,

alkylsulphinyl or alkylsulphonyl of 1 to 4 carbon atoms, or amino which may itself be substituted by methyl or ethyl);

R^2 represents hydrogen, halogen, cyano, amino, alkylamino or dialkylamino (in which each alkyl moiety is of 1 to 4 carbon atoms), alkyl or alkoxy of 1 to 6 carbon atoms (unsubstituted or substituted by halogen, hydroxy, alkoxy of 1 to 4 carbon atoms or alkanoyl-oxy of 2 to 5 carbon atoms), alkoxycarbonyl of 2 to 5 carbon atoms, or pyrrolyl which is unsubstituted or substituted by alkyl of 1 to 4 carbon atoms:

R^3 represents a phenyl group substituted by halogen, nitro, cyano, alkoxycarbonyl of 2 to 6 carbon atoms, or by alkyl, alkoxy or alkylthio of 1 to 4 carbon atoms which may be further substituted by halogen; and

R^4 represents hydrogen, alkyl of 1 to 6 carbon atoms, alkanoyl of 1 to 6 carbon atoms, benzoyl, alkylsulphonyl of 1 to 6 carbon atoms, alkoxycarbonyl in which the alkyl moiety is of 1 to 6 carbon atoms, dimethylcarbamoyl or benzyl.

11. A herbicidal composition which comprises one or more triazole sulphonamides according to claim 1, in association with a suitable carrier and/or surface active agent.

4,889,554

DIPHENYL ETHER DERIVATIVES, THEIR PREPARATION AND THEIR USE FOR CONTROLLING UNDESIRABLE PLANT GROWTH

Arno Lange, Bad Duerkheim-Hardenburg; Bruno Wuerzer, Otterstadt, and Norbert Meyer, Ladenburg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

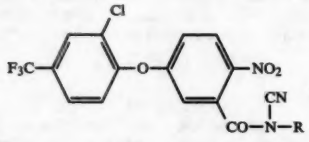
Continuation of Ser. No. 919,066, Oct. 15, 1986, abandoned. This application Oct. 28, 1988, Ser. No. 266,239

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1985, 3536664

Int. Cl.[4] A01N *37/18*; C07C *125/08*

U.S. Cl. 71—118 **8 Claims**

1. A diphenyl ether of the formula



where R is hydroen or an unsubstituted or C_1–C_4-alkoxy substituted C_1–C_4-alkyl, C_2–C_4-alkenyl, C_2–C_4-alkynyl or C_3–C_8-cycloalkyl radical and salts of the diphenyl ether in which R is hydrogen.

4,889,555

PROCESS OF MAKING BINDERLESS BRIQUETS FROM STEELWORKS DUSTS

Ladislau Szekely, deceased, late of Wölfersheim, Fed. Rep. of Germany (by Helene Daniello, legal representative), and Fred Stieler, Heusenstramm, Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

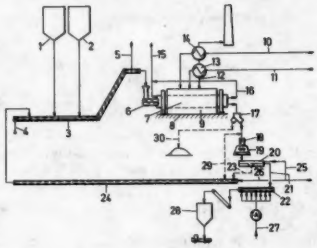
Filed Sep. 20, 1988, Ser. No. 247,023

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1987, 3732351

Int. Cl.[4] C22B *1/16*

U.S. Cl. 75—0.5 R **4 Claims**

1. In a process of making binder-free briquets from fine-grained steelworks dusts, which contain metallic iron, wherein the steelworks dusts are heated and in a hot state are briquetted on a briquetting roll press and the hot briquets are air-cooled, the improvement comprising: heating steelworks dusts which contain more than 15% metallic iron to a briquetting temperature above 500° C. in an indirectly heated rotary kiln under an atmosphere which is inert to the metallic iron, briquetting the heated dusts in the briquetting roll press under an inert atmosphere and under a roll pressure from 60 to 150 kN/cm roll width to produce hot briquets, separating the hot briquets



under an inert atmopshere from fines produced during said briquetting, air-cooling the briquets to a temperature below 130° C. and recycling the fines to the rotary kiln.

4,889,556

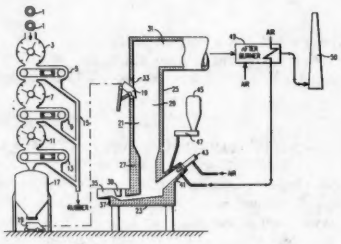
METHOD OF RECYCLING STEEL BELTED TIRES

Shyam V. Dighe, North Huntingdon, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 1, 1988, Ser. No. 226,712

Int. Cl.[4] C22B *4/00*

U.S. Cl. 75—10.22 **14 Claims**



1. A method of recycling steel belted tires comprising the steps of:

utilizing steel belted tires as the only source of iron;

placing steel-belted tires containing rubber coated steel in a plasma fired cupola said cupola having hearth and shaft portions with coke and a fluxing agent;

operating the plasma-fired cupola to burn the rubber and form a molten pool of iron and slag within the hearth portion of the cupola;

adding a desulfurizing agent to the cupola via a plasma torch feed nozzle; and

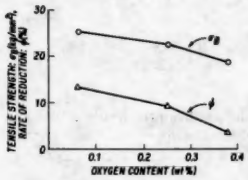
operating a plasma torch at a power level sufficient to melt the desulfurizing agent in the plasma torch feed nozzle, the melted desulfurizing agent reacting with sulfur in the molten iron and the reacted and unreacted desulfurizing agent combining with the slag, reducing its viscosity and making it flow better.

4,889,557

ALUMINIUM ALLOY HAVING AN EXCELLENT FORGIABILITY

Yasuo Iwata; Shigenori Mae; Yoshio Urai, and Takayuki Tsunoda, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Mar. 24, 1988, Ser. No. 172,561
Claims priority, application Japan, Mar. 30, 1987, 62-077144
Int. Cl.[4] C22C 21/00
U.S. Cl. 75—249 3 Claims



1. A piston for an internal-combustion engine made by hot forging an extruded aluminium alloy comprising, by weight percent, less than 30% silicon, less than 8% iron, less than 7% copper, and less than 0.2% oxygen, the balance being substantially aluminium, wherein a test piece from a top portion of said piston exhibits a tensile strength not less than 23 kg/mm^2 with a rate of reduction of not less than 10%.

4,889,558

COATING COMPOSITIONS CONTAINING UNDISSOLVED HEXAVALENT CHROMIUM SALT

Mark F. Mosser, Sellersville, Pa., assignor to Sermatech International, Inc., Limerick, Pa.

Continuation-in-part of Ser. No. 555,477, Nov. 28, 1983, abandoned. This application Sep. 18, 1985, Ser. No. 777,228
Int. Cl.[4] C04B 9/02
U.S. Cl. 106—14.12 18 Claims

1. A coating composition for a substrate metal part to be coated having improved salt spray resistance, which coating composition comprises an aqueous acid binder solution of dissolved phosphate ions, dissolved ions selected from the group consisting of chromate and molybdate ions, and, undissolved solid hexavalent chromium salt, said undissolved solid hexavalent chromium salt being in an amount which is in an excess of the amount which is soluble in the binder, and thereby is in an insoluble amount.

4,889,559

LATENT INK

Murrell A. Goldberg, 805 Berwyn Dr., Louisville, Ky. 40223, and Jack Sammons, 4223 Hopewell Rd., Louisville, Ky. 40299

Filed Jun. 4, 1984, Ser. No. 616,954
Int. Cl.[4] C09D 11/00
U.S. Cl. 106—21 3 Claims

1. A latent ink comprising,

an aqueous solution carrier medium;

a latent image forming material having a Redox indicator as the coloring component of the ink;

a thickening and film forming agent selected from the group consisting of ethylene oxide derivatives of cellulose, and propylene oxide derivatives of cellulose or any combination thereof, for the formation of a thin, clear resin film of uniformly dispersed latent image forming material when the ink is applied to a substrate; and,

a liquid humectant comprising a hydroxylated compound which has been reacted with ethylene oxide or propylene oxide for preventing the thickening and film forming agent from becoming brittle when the ink is dried on the substrate.

4,889,560

PHASE CHANGE INK COMPOSITION AND PHASE CHANGE INK PRODUCED THEREFROM

Charles W. Jaeger, Beaverton; Donald R. Titterington, Tualatin, both of Oreg.; Hu P. Le, Westminster, Calif., and Jeffrey J. Sopko, Portland, Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Aug. 3, 1988, Ser. No. 227,846
Int. Cl.[4] C09D 11/06
U.S. Cl. 106—27 31 Claims

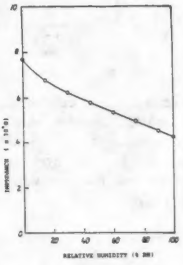
1. A phase change ink carrier composition for producing a phase change ink composition in combination with a compatible colorant, comprising a fatty amide-containing material, said fatty amide-containing material comprising a tetraamide compound and a mono-amide compound, said phase change ink carrier composition being in a solid phase at ambient temperature and in a liquid phase at elevated operating temperature, thin films of uniform thickness of said respective ink carrier composition and said ink composition produced therefrom having a high degree of lightness and chroma, and thin films of uniform thickness of said ink composition being rectilinearly light transmissive.

4,889,561

MOISTURE SENSITIVE MATERIAL

Takashi Sugihara, and Masaya Hijikigawa, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Feb. 4, 1985, Ser. No. 697,932
Int. Cl.[4] C08L 1/12
U.S. Cl. 106—196 6 Claims



1. A moisture sensor containing a moisture sensitive material prepared by cross-linking cellulose acetate through at least one compound selected from the group consisting of compounds containing two or more isocyanate groups; compounds containing two or more epoxy groups; compounds containing two or more carboxyl groups,

and acid anhydrides of carboxylic acids, said moisture sensitive material characterized by a linear relationship between the impedance of said moisture sensor and the relative humidity in the range of 20% to 100% of the relative humidity.

4,889,562

ORGANIC PIGMENTS COATED WITH CROSSLINKED ETHYL CELLULOSE

Philippe Bugnon, Essert, and Bernhard Medinger, Giffers, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 6, 1988, Ser. No. 202,857
Claims priority, application Switzerland, Jun. 16, 1987, 2258/87
Int. Cl.[4] C08K *5/00*; C09D *11/40*; B32B *5/16*; C08L *1/08*
U.S. Cl. 106—204 15 Claims

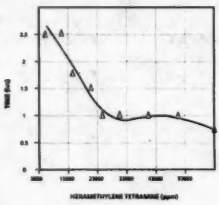
1. A composition containing an organic pigment, the particles of which pigment are provided with a tenacious, dense, highly crosslinked coating of ethyl cellulose.

4,889,563

PROCESS FOR RETARDING AND CONTROLLING THE FORMATION OF GELS OR PRECIPITATES DERIVED FROM ALUMINIUM AND CORRESPONDING COMPOSITIONS, PLUS THE CORRESPONDING APPLICATIONS-IN PARTICULAR REGARDING OIL WELLS

Alan Parker, St Etienne, France, and Colin Davidson, Rijswijk, Netherlands, assignors to Dowell Schlumberger Incorporated, Tulsa, Okla.

Filed Jul. 2, 1986, Ser. No. 881,147
Claims priority, application France, Jul. 2, 1985, 85 10272; Apr. 30, 1986, 86 06434
Int. Cl.[4] C09K *3/00*
U.S. Cl. 106—287.17 5 Claims



1. A process for retarding and controlling the formation of gels or precipitates derived from aluminum comprising providing a partially neutralized acid aluminum salt in an aqueous solution with an activator selected from urea and hexamethylene-tetramine, wherein said partially neutralized acid aluminum salt has the formula:

$$Al_2(OH)_5Cl, 2.5\ H_2O.$$

4,889,564

MAGNETIC DISK CLEANING METHOD AND APPARATUS

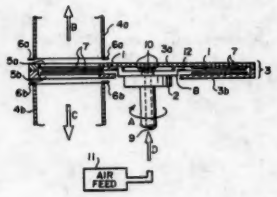
Yasushi Kikuchi, and Hideki Matsuzawa, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 8, 1987, Ser. No. 93,661
Claims priority, application Japan, Sep. 5, 1986, 61-209186
Int. Cl.[4] B08B *5/02, 5/04*
U.S. Cl. 134—21 7 Claims

1. A method of cleaning a magnetic disk, which comprises the steps of:

(i) rotating a magnetic disk housed in a case, wherein said magnetic disk is housed in said case during recording and reproduction operations,

(ii) feeding a gas into said case, and at the same time



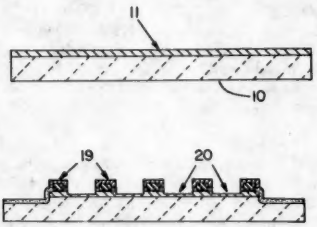
(iii) sucking the gas from the inside of said case via window openings formed in upper and lower surfaces of said case.

4,889,565

HIGH TEMPERATURE PHOTOVOLTAIC SYSTEM

John C. C. Fan, Chestnut Hill, and Paul M. Zavracky, Norwood, both of Mass., assignors to Kopin Corporation, Taunton, Mass.

Filed Aug. 20, 1987, Ser. No. 87,459
Int. Cl.[4] H01L *31/06*
U.S. Cl. 136—256 4 Claims



1. A solar cell comprising:

a single crystal semiconductor wafer having a mesa structure with a light incident photoactive surface thereon;

a junction in the mesa such that the periphery of the mesa defines the periphery of the junction;

a conductive grid in conductive contact with the photoactive surface such that at least a portion of the grid extends continuously across the periphery of the junction; and

a contact area on the wafer in conductive contact with the grid outside the periphery of the junction.

4,889,566

METHOD FOR PRODUCING COLD ROLLED STEEL SHEETS HAVING IMPROVED SPOT WELDABILITY

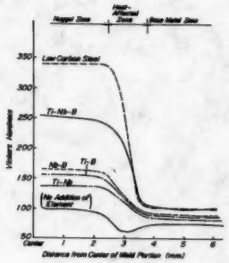
Susumu Okada; Makoto Imanaka; Susumu Masui; Takashi Obara; Masatoshi Shinozaki, and Kozo Tsunoyama, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

Filed Jun. 9, 1988, Ser. No. 204,619
Claims priority, application Japan, Jun. 18, 1987, 62-150313; Jun. 19, 1987, 62-152977; Jun. 19, 1987, 62-152978; Jun. 19, 1987, 62-152979
Int. Cl.[4] C21D *8/02*
U.S. Cl. 148—2 3 Claims

1. A method of producing a cold rolled steel sheet having

improved strength and toughness at a weld portion, comprising:

subjecting molten steel comprising not more than 0.004 wt % of C, not more than 0.1 wt % of Si, not more than 0.5 wt % of Mn, not more than 0.025 wt % of P, not more than 0.025 wt % of S, not more than 0.0040 wt % of N, 0.01~0.04 wt % of Ti, 0.003~0.010 wt % of Nb, 0.0001~0.0010 wt % of Ti, 0.01~0.10 wt % of Al and the remainder being substantially Fe to a solidification and cooling step to form a slab, during which said molten steel is cooled at a cooling rate of not less than 3° C./min within a temperature range of at least 1,300°-1,000° C.;



heating the slab to a temperature of not greater than,1,200° C.;

subjecting said slab to hot rolling;

subjecting said slab to cold rolling; and

subjecting said slab to a continuous annealing within a temperature range of 700°~900° C.;

whereby fine precipitates of Ti having a grain size of not more than 0.05 μm are uniformly dispersed into the steel in an amount of not less than 30 ppm as a Ti conversion amount.

4,889,567

HIGH STRENGTH AND HIGH TOUGHNESS STEEL BAR, ROD AND WIRE AND THE PROCESS OF PRODUCING THE SAME

Tadayoshi Fujiwara, Mino; Yukio Yamaoka, Sakai; Kazuichi Hamada, Mino; Yoshiro Yamada, Akashi; Yasunobu Kawaguchi, Kobe; Yasuhiro Oki, Kobe; Takashi Taniguchi, Kobe, and Hiroyuki Takahashi, Kobe, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko, Kobe and Shinko Kosen Kogyo Kabushiki, Amagasaki, both of, Japan

Continuation of Ser. No. 841,291, Mar. 19, 1986, abandoned. This application Jul. 1, 1988, Ser. No. 214,817

Claims priority, application Japan, May 14, 1985, 60-102273

Int. Cl.[4] C22C *38/02*; C21B *8/06*

U.S. Cl. 148—12 B **16 Claims**

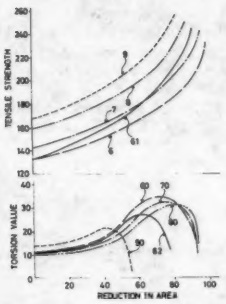
1. A process for producing a high strength and high toughness steel article having a bar, rod, or wire shape, said process comprising:

(i) adjusting the chemical composition of a high carbon steel article to a carbon content of from 0.7 to 1.0%, a silicon content of from 0.5 to 2.0%, and a manganese content of from 0.3 to 2.0%, and the balance iron with incidental impurities;

(ii) adjusting said high carbon steel article to a fine pearlite structure;

(iii) adjusting the tensile strength of the said high carbon steel article, in a patenting process, to a tensile strength greater than 140 kgf mm^{-2};

(iv) in multiple stages, drawing the said article into a desired size by passing the said article through dies from 7 to 16 times at a drawing speed of from 50 to 500 m min^{-1} and a reduction in area of from 70 to 93%, and with cooling of the said drawn article with water immediately after each individual drawing stage during the later stages of the drawing process; and



(v) obtaining an article having a tensile strength greater than (260 - 68 log d) kgf mm^{-2}.

4,889,568

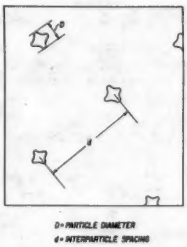
AMORPHOUS ALLOYS FOR ELECTROMAGNETIC DEVICES CROSS REFERENCE TO RELATED APPLICATIONS

Amitava Datta, Madison; Lance A. Davis, Morristown; Nicholas J. DeCristofaro, Chatham, and Jordi Marti, Randolph, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Division of Ser. No. 286,918, Jul. 29, 1981, Pat. No. 4,409,041, which is a continuation-in-part of Ser. No. 191,475, Sep. 26, 1980, abandoned. This application Jul. 28, 1983, Ser. No. 518,163

Int. Cl.[4] C21D *1/04*

U.S. Cl. 148—108 **10 Claims**



1. A method of enhancing the magnetic properties of an alloy consisting essentially of iron, boron and silicon having at least 85 percent of its structure in the form of an amorphous metal matrix, comprising the step of annealing said alloy in the absence of a magnetic field at a temperature and for a time sufficient to induce precipitation of discrete particles in said amorphous metal matrix, said particles having an average size ranging from about 0.05 μm to 1 μm and an average interparticle spacing of about 1 μm to 10 μm, and constituting an average volume fraction of said alloy of about 0.01 to 0.3.

6. A method of enhancing the magnetic properties of an alloy consisting essentially of iron, boron and silicon having at least 85 percent of its structure in the form of an amorphous metal matrix, comprising the step of annealing said alloy in the presence of a magnetic field at a temperature and for a time sufficient to induce precipitation of discrete particles in said amorphous metal matrix, said particles having an average size ranging from about 0.05 μm to 1 μm and an average interparti-

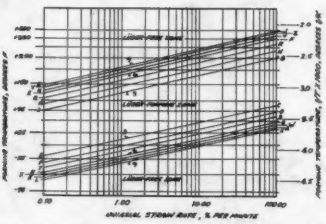
cle spacing of about 1 μm to 10 μm, and constituting an average volume fraction of said alloy of about 0.01 to 0.3.

4,889,569

LITHIUM BEARING ALLOYS FREE OF LÜDER LINES

Wesley H. Graham, Renton; Sven E. Axter, Bellevue, and Fu-Shiong Lin, Renton, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Mar. 24, 1988, Ser. No. 173,091
Int. Cl.[4] C21D *1/78*
U.S. Cl. 148—130 20 Claims



1. A metal sheet comprising: a sheet of an aluminum-lithium alloy consisting essentially of:

(a) about 1.7 to about 2.8% by weight lithium;

(b) about 1.0 to about 3.0% by weight copper;

(c) about 0.0 to about 2.0% by weight magnesium;

(d) about 0.04 to about 0.16% by weight zirconium; and

(e) aluminum; the sheet intentionally stretched at least 3% of its original dimensions in the direction of the stretch under a predetermined combination of temperature and stretch rate conditions that provides the stretched sheet substantially free of Lüder lines.

4,889,570

BLASTING EXPLOSIVE WITH IMPROVED WATER RESISTANCE

Dennis Y. Leong, Vancouver, Canada, assignor to ETI Explosives Technologies International (Canada), Ltd., Mississauga, Canada

Filed Mar. 23, 1989, Ser. No. 327,842
Int. Cl.[4] C06G *45/34*
U.S. Cl. 149—7 26 Claims

1. A blasting explosive comprising a particulate blend of from about 5 to about 27 wt. % of a slurry explosive and from about 73 to about 95 wt. % of a mixture of ammonium nitrate particles and a liquid hydrocarbon fuel based on the weight of the slurry and the ammonium nitrate/fuel mixture, the mixture of ammonium nitrate particles and a liquid hydrocarbon fuel containing from about 3.0 to about 6.0 wt. % hydrocarbon fuel based on the weight of the ammonium nitrate/fuel mixture, said particles of said blend being coated first with a gelling agent and then coated with an anticaking agent.

4,889,571

HIGH-ENERGY COMPOSITIONS HAVING CASTABLE THERMOPLASTIC BINDERS

Rodney L. Willer, New London, Pa.; James A. Hartwell, Elkton, Md., and Robert G. Gleeson, Newark, Del., assignors to Morton Thiokol, Inc., Chicago, Ill.

Filed Sep. 2, 1986, Ser. No. 903,000
Int. Cl.[4] C06B *45/10*
U.S. Cl. 149—19.9 14 Claims

1. A melt-cast propellant composition comprising energetic particulate solids dispersed in and spatially immobilized in a binder system having between about 25 and about 50 weight percent of 1,2 syndiotactic polybutadiene and between about 50 and about 75 weight percent of a plasticizer miscible with said polybutadiene.

4,889,572

METHODS OF MAKING TILE DESIGNS

Richard Danico, and Kathleen Danico, both of 620 Palm Dr., Satellite Beach, Fla. 32937

Filed Dec. 4, 1987, Ser. No. 128,723
Int. Cl.[4] B44C *1/28, 3/12*
U.S. Cl. 156—63 22 Claims

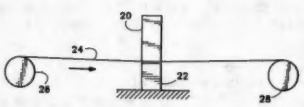
1. A method of producing tile design units comprising the steps of (a) placing a solid substrate over an existing design, said substrate having sufficient transparency so that said design is visible therethrough and wherein said substrate has sufficient rigidity to maintain its shape; and (b) permanently securing commercially available precut pieces of tile having a rough back face and a colored front face to said substrate using said design as a pattern with an adhesive applied between the substrate and the back face of said pieces of tile whereby said pieces of tile and said substrate in combination form a tile design unit comparable to said existing design.

4,889,573

METHOD OF FORMING A PATTERN OF CONDUCTOR RUNS ON A SHEET OF DIELECTRIC MATERIAL

William W. Stein, Beaverton, and Lawrence J. Miller, Portland, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed May 23, 1988, Ser. No. 197,484
Int. Cl.[4] C03B *29/00*
U.S. Cl. 156—89 14 Claims



1. A method of forming a pattern of conductor runs on a receiver sheet of dielectric material, comprising:

(a) providing a transfer sheet comprising a carrier foil having a metal-containing coating adhered to one main face thereof, and a receiver sheet of green ceramic material,

(b) placing the transfer sheet with the coating in contact with the receiver sheet, and

(c) detaching the coating material from the carrier foil over selected areas of said one main face thereof and adhering the detached coating material to the receiver sheet.

4,889,574

WINDOW RETENTION METHOD

Herbert Furman, Farmington Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 31, 1988, Ser. No. 264,668
Int. Cl.[4] E06B *3/54*; B60J *1/02*
U.S. Cl. 156—108 1 Claim

1. A method of adhesively and mechanically mounting a window panel in vehicle body having a window opening defined by flanges of inner and outer vehicle body panels comprising:

stamping the outer panel flange with an aperture through the flange;

stamping the inner panel flange with a depression formed therein,

assembling the outer and inner panels by attaching the outer panel flange to the inner panel flange in overlying relationship therewith and with the aperture communicating with the depression,

applying a bead of uncured curable adhesive along the outer panel flange so that adhesive flows through the aperture and into the depression,

pressing the window panel against the adhesive,

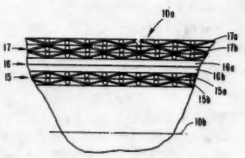
and curing the adhesive so that the adhesive adhesively bonds to the window panel and the outer flange, and the adhesive in the aperture and the depression mechanically connects the window panel and the inner and outer panels.

4,889,575

METHOD OF MANUFACTURING GOLF CLUB SHAFTS

Paul A. Roy, Poway, Calif., assignor to Fiber-Speed International, Inc., Naples, Fla.

Division of Ser. No. 895,728, Aug. 12, 1986, Pat. No. 4,757,997, which is a continuation-in-part of Ser. No. 871,303, Jun. 6, 1986, abandoned. This application Jun. 24, 1988, Ser. No. 211,462
Int. Cl.[4] A63B *53/10*
U.S. Cl. 156—189 17 Claims



1. A method of making a golf shaft comprising:

cutting a resin-impregnated fiber cloth into a base blank having a long base and having a majority of the fibers oriented and running parallel to the base of the blank and a minority of the fibers oriented and running perpendicualr to the base of the blank;

cutting a resin-impregnated, parallel array of fibers into a central blank having a long base with a wide grip end and a narrower tip end and having the parallel array of fibers oriented and running parallel to the base of the central blank;

cutting a resin-impregnated fiber cloth into an outer blank having a long base and having a majority of the fibers oriented and running parallel to the base of the outer blank and a minority of the fibers oriented and running perpendicular to the base of the blank;

preparing a mandrel by applying a release agent and maintaining the mandrel at a temperature to assist assembly of the blanks but below the curing temperature of the resin;

assembling said blanks on said mandrel, one after the other by

aligning the long base of the inner base blank with the longitudinal axis of the mandrel and wrapping the base blank onto the mandrel for a plurality of layers so that a majority of its fibers are substantially parallel to the longitudinal axis of the mandrel;

aligning the base of the central blank with the longitudinal axis of the mandrel and wrapping the central blank onto the base blank for a plurality of layers so that its parallel array of fibers are substantially parallel to the longitudinal axis of the mandrel;

aligning the long base of the outer blank with the longitudinal axis of the mandrel and wrapping the outer blank onto the central blank for a plurality of layers so that a majority of its fibers are substantially parallel to the longitudinal axis of the mandrel; and

pressing the assembled blanks onto the mandrel by applying pressure along the length of the assembled blanks; and

placing the shaft and mandrel in the oven to cure the resin and form an integrated structure.

4,889,576

METHOD FOR JOINING SILICONE-COATED FABRICS

Noriyuki Suganuma, and Hideo Shimmi, both of Chiba, Japan, assignors to Toray Silicone Company Limited, Tokyo, Japan

Filed Sep. 22, 1986, Ser. No. 909,645
Claims priority, application Japan, Nov. 10, 1985, 60-226582
Int. Cl.[4] B32B *31/00*
U.S. Cl. 156—249 7 Claims

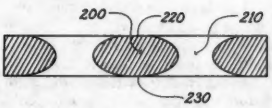
1. Method for joining silicon rubber-coated fabrics, characterized by overlapping silicone rubber-coated fabrics with the insertion at the overlap region of a silicone rubber adhesive which is plastic at room temperature and which is a radical-curing type containing organoperoxide, or an addition-curing type containing a platinum-type catalyst, followed by press-adhering and then by hot-curing, or by hot-curing during press-adhesion.

4,889,577

METHOD FOR MAKING AN IMPROVED SUPPORTED MEMBRANE/ELECTRODE STRUCTURE COMBINATION WHEREIN CATALYTICALLY ACTIVE PARTICLES ARE COATED ONTO THE MEMBRANE

James W. McMichael, Lake Jackson, and Robert D. Door, West Columbia, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 19, 1986, Ser. No. 944,474
Int. Cl.[4] B32B *31/00*; C25B *11/20*
U.S. Cl. 156—281 29 Claims



1. A method for making an improved membrane/electrode combination comprising:

(a) contacting a first face of an ion exchange membrane with a substantially flat electrically conductive electroformed screen having a plurality of openings occupying up to about 75% of the surface area of each face of the electrically conductive screen, thereby leaving a portion of the membrane exposed through the holes in the electrically conductive electroformed screen;

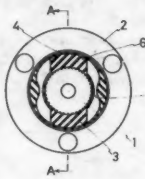
(b) coating the portion of the membrane exposed through the openings in the electrically conductive electroformed screen with catalytically active particles; and

(c) bonding the membrane to the catalytically active particles and the electrically conductive electroformed screen.

4,889,578
METHOD FOR MANUFACTURING RUBBER VIBRATION INSULATOR USING A HALOGEN COMPOUND SOLUTION

Mori Kei; Kikyo Mitsuyuki, and Yabuki Kouiti, all of Okayama, Japan, assignors to Kurashiki Kako Co., Ltd., Okayama, Japan

Filed Jan. 29, 1988, Ser. No. 150,055
Int. Cl.[4] C09J 5/02; F16F 9/02
U.S. Cl. 156—294 2 Claims



1. A method for manufacturing rubber vibration insulator formed by compounding rubber elastic bodies between an inner metal fitting and an outer shell metal fitting consisting the ordered steps of:

forming a thin rubber layer sufficient to cover the metal surface of an inner surface of said outer metal shell;

forming a thick rubber layer on the metal surface of the inner metal fitting of sufficient thickness to maintain the distance between the inner metal fitting and the outer shell metal fitting;

adhering by vulcanization said thin rubber and said thick rubber layer to said metal surfaces respectively;

applying a halogen compound solution to adhesion surfaces of both said thin and thick rubber layers;

press-fitting said inner metal fitting having said thick rubber layer to said shell metal fitting having said thin rubber layer using a lubricant or an adhesive having lubricating properties; and

adhering both said thin and thick rubber layers together by heating said fitted inner metal fitting and outer shell metal fitting.

4,889,579
PROCESS FOR ADHERING ARAMID POLYMERS

Robert R. Burch, Exton, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 6, 1988, Ser. No. 226,248
Int. Cl.[4] C09J 5/00
U.S. Cl. 156—305 7 Claims

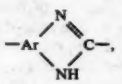
1. A method for adhering aramid structures to one another comprising the steps, in sequence, of

(i) treating at least one structure with strong base to create anionic sites on the aramid surface,

(ii) contacting the treated structure with an aramid-containing structure to which it is to be adhered, and

(iii) reprotonating the anionic sites on the treated structure with a proton donor to adhere said structure to the structure with which it is in contact, said aramid having at least one repeating unit selected from the group:

(a) —NHR^{10}CO—, (b) R^{11}—NHCONH—, and (c)



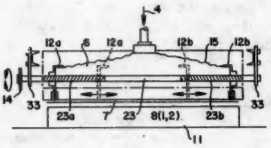
wherein:

R^{10} is selected from R— and R^{11}NHCOR^{12}, R^{11} and R^{13}, individually, are selected from m-phenylene, p-phenylene, 3,3'-biphenylene, 3,4'-biphenylene, 4,4'-biphenylene and 4,4'-diphenylene ether, R^{12}, is selected from R^{11} and CH_{2x}, Ar is an aryltriyl radical in which two of the three radical bonds are adjacent to one another and attached to nitrogen atoms, and x is 1 to 10.

4,889,580
DOUBLE FACER

Yukuharu Seki, and Noriyasu Haraguchi, both of Mihara, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Hiroshima, Japan

Filed Feb. 25, 1988, Ser. No. 160,414
Claims priority, application Japan, Mar. 2, 1987, 62-28813[U]
Int. Cl.[4] B32B 11/06
U.S. Cl. 156—382 3 Claims

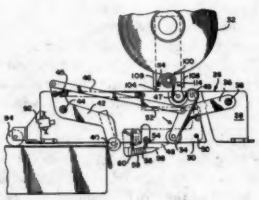


1. A double facer, in which when a single-faced corrugated cardboard sheet and a liner are being pinched and conveyed by a belt on the upper side and a heating box on the lower side, pressurized air is fed from an air chamber onto the back side of said belt to press the single-faced corrugated cardboard sheet and the liner onto the side of said heating box and thereby said single-faced corrugated cardboard sheet and said liner are made to stick to each other; characterized in that there is provided a single air chamber, of which side walls of said air chamber are supported in a movable manner in the width-wise direction of said sheet and a sealing member is disposed in a freely movable manner between said side walls and said belt, wherein the upper edges of the side walls of said air chamber are fixedly secured to bellows which are expansible in the direction of movement of the side walls of said air chamber and which cover the upper surface of said belt on the upper side.

4,889,581
CARTON SEALING APPARATUS

Lawrence W. Ulrich, Cicero, and James R. Lojewski, Oak Park, both of Ill., assignors to Durable Pakaging Corporation, Chicago, Ill.

Filed Nov. 14, 1988, Ser. No. 272,127
Int. Cl.[4] B32B 31/18
U.S. Cl. 156—443 9 Claims



1. In an apparatus for sealing the top flaps of a carton directed therethrough, said apparatus having a tape head assembly for applying a strip of self-adhesive sealing tape that extends along the upper portions of the leading and trailing end panels and across said top flaps in sealing relationship thereto, said tape head assembly including cutting means for cutting the strip of sealing tape at the trailing end thereof and tab forming

means for forming a pull tab at a trailing end portion of said strip of sealing tape, said tab forming means including a housing member positioned a short distance from said cutting means having a cavity formed therein in facing relationship to said trailing end portion, and means for creating a suction in said cavity for drawing said trailing end portion thereinto so as to cause the adhesive surface of said trailing end portion to fold upon itself and form a pull tab.

4,889,582

AGE HARDENABLE DISPERSION STRENGTHENED HIGH TEMPERATURE ALUMINUM ALLOY

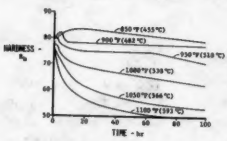
James W. Simon, Jr., Jupiter, and Kathleen Gorman, W. Palm Beach, both of Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 27, 1986, Ser. No. 923,781

The portion of the term of this patent subsequent to Mar. 3, 2004, has been disclaimed.

Int. Cl.[4] C22F *1/04*

U.S. Cl. 148—12.7 A **1 Claim**



1. A method for producing a high temperature aluminum article from an alloy consisting of 5–15% iron, 1–5% molybdenum, 0.2–6 vanadium, balance essentially aluminum including the steps of:

a. melting the composition;

b. solidifying the composition at a rate in excess of about 10^3° C. per second to form a particulate;

c. consolidating the particulate at a temperature below about 800° F.;

d. heat treating at a temperature between about 800° F. and 1000° F. for a period of time from about 1 to about 100 hours to produce an age hardened material.

4,889,583

CAPPING TECHNIQUE FOR ZONE-MELTING RECRYSTALLIZATION OF INSULATED SEMICONDUCTOR FILMS

Chenson K. Chen, Weston, and Bor-Yeu Tsaur, Bedford, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 805,117, Dec. 4, 1985, abandoned. This application Nov. 20, 1987, Ser. No. 124,346

Int. Cl.[4] C03B *1/08*

U.S. Cl. 156—604 **14 Claims**

2. A method of forming an encapsulated insulated semiconductor film structure, comprising

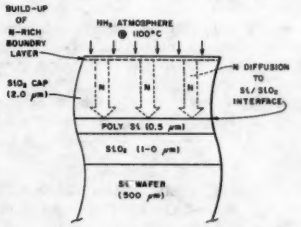
forming a first layer of insulating material on a substrate,

forming a second layer of amorphous or polycrystalline silicon,

forming a third layer of silicon dioxide to form a silicon dioxide capped silicon on insulator structure,

providing an atmosphere consisting essentially of inerts and a noninert gas, stable at ambient temperature, which is a source of a reactive material whose presence promotes wetting of molten silicon on silicon dioxide, said noninert gas decomposing below the melting point of silicon to release said reactive material, said noninert gas being selected from the group consisting of ammonia and alkyl amines,

annealing said structure in said atmosphere at a temperature below the melting point of silicon but high enough to decompose said gas so as to release said reactive material for a sufficient length of time to diffuse quantities of said reactive material through the third layer to the interface



with the second layer in an amount sufficient to avoid agglomeration of the resulting semiconductor film, and subjecting the annealed structure resulting from the preceding steps to zone melting recrystallization.

4,889,584

METHOD OF PRODUCING CONDUCTOR CIRCUIT BOARDS

Tatsuo Wada, Ebina; Toshiro Miki, Yokohama, and Masamitsu Takenaka, Narashino, all of Japan, assignors to Meiko Electronics Co., Ltd., Kanagawa and Toagosei Chemical Industry Co., Ltd., Tokyo, both of, Japan

Filed Mar. 31, 1989, Ser. No. 332,565

Int. Cl.[4] B44C *1/22*; C23F *1/02*; C03C *15/00, 25/06*

U.S. Cl. 156—630 **10 Claims**

1. A method of producing a conductor circuit board, comprising the steps of:

forming a resist mask on a surface of a planar, electrically conductive substrate except portions thereof on which conductor circuits and dummy circuit are to be formed, said dummy circuit being formed between and close to conductor circuits which are isolated from each other;

forming said conductor circuits and said dummy circuit on the surface of said electrically conductive substrate by electroplating;

removing said resist mask from said electrically conductive substrate;

forming a thin metal film over the surface of said electrically conductive substrate and surfaces of said conductor circuits;

superposing an insulating substrate on the surface of said electrically conductive substrate on which said conductor circuits and said thin metal film are formed, and pressure-bonding said insulating substrate and said electrically conductive substrate together to obtain a laminate;

separating only said electrically conductive substrate from said laminate, to obtain a circuit board; and

removing portions of said thin metal film which electrically connect between said conductor circuits, by etching.

4,889,585

METHOD FOR SELECTIVELY FORMING SMALL DIAMETER HOLES IN POLYIMIDE/KEVLAR SUBSTRATES

Richard N. Leyden, Topanga; Robert Lawrence, Malibu, and William E. Elias, Redondo Beach, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Continuation of Ser. No. 923,251, Oct. 27, 1986, abandoned. This application May 31, 1988, Ser. No. 205,010

Int. Cl.[4] B44C *1/22*

U.S. Cl. 156—630 **7 Claims**

1. A method for forming holes of predetermined size and

shape in a polyimide/polyamide substrate having thereon at least one metallic layer adhesively joined thereto comprising:

(a) forming at least one opening in said metallic layer, exposing polyimide/polyamide material below;

(b) contacting the polyimide/polyamide material exposed in said at least one opening with hot concentrated sulfuric acid with a temperature of at least about 185° C., and for a time sufficient to form at least one hole of predetermined size and shape in the polyimide/polyamide layer, and then removing the substrate from the acid and washing with water; and

(c) contacting the substrate with a liquid honing medium to smooth any rough edges of said at least one hole.

4,889,586

METHOD FOR POLISHING ALGAAS SURFACES

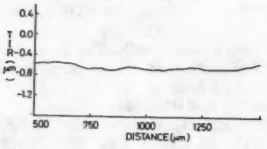
Masahiro Noguchi, and Osamu Yamamoto, both of Ushiku, Japan, assignors to Mitsubishi MonsantoChemical Company and Mitsubishi Kasei Corporation

Filed Mar. 30, 1989, Ser. No. 330,587

Claims priority, application Japan, Apr. 1, 1988, 63-80703

Int. Cl.[4] H01L *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—636 **7 Claims**



1. A method for polishing AlGaAs surfaces, in which a substrate or epitaxial layer of $Al_xGa_{1-x}As$ wherein $0<x<1.0$ is polished on the surface with the use of a hypochlorite base polishing liquid.

4,889,587

METHOD OF PREPARING A SUBSTRATE FOR INK JET HEAD AND METHOD OF PREPARING AN INK JET HEAD

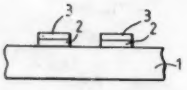
Hirokazu Komuro, Hiratsuka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 2, 1988, Ser. No. 279,086

Claims priority, application Japan, Dec. 2, 1987, 62-303263

Int. Cl.[4] B44C *1/22;* **C03C** *15/00, 25/06;* **C23F** *1/02*

U.S. Cl. 156—643 **34 Claims**



1. A method of preparing an ink jet head comprising a support; an electrothermal transducer formed on said support and having a heat-generating resistor and a pair of electrodes connected electrically to said heat-generating resistor; and a liquid path formed on said support corresponding to the heat-generating portion of said electrothermal transducer formed between said pair of electrodes, and communicating with a discharge opening for discharging liquid, which comprises the step of dry etching to pattern the material for said heat-generating resistor provided on said support in the form of a layer.

4,889,588

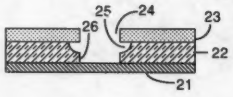
PLASMA ETCH ISOTROPY CONTROL

Gianni O. Fior, Albany, Calif., assignor to Tegal Corporation, Petaluma, Calif.

Filed May 1, 1989, Ser. No. 345,795

Int. Cl.[4] B44C *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—643 **7 Claims**



1. In a method for treating a semiconductor wafer subjected to a plasma glow discharge in a tri-electrode reactor having top, side, and lower electrodes, the improvement comprising:

placing a wafer to be treated on said lower electrode;

applying RF power only between the top and side electrodes of said reactor to cause an isotropic etch of said wafer; and

applying RF power between the top and lower electrodes of said reactor to cause an anisotropic etch of said wafer.

4,889,589

GASEOUS REMOVAL OF CERAMIC COATINGS

Charles C. McComas, Stuart, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 878,720, Jun. 26, 1986, abandoned. This application Apr. 11, 1988, Ser. No. 180,594

Int. Cl.[4] C03C *15/00*

U.S. Cl. 156—646 **7 Claims**

1. A method for removing a ceramic coating from a metallic substrate, said coating containing at least 5% by volume of porosity, including comprising the steps of providing a metallic substrate having a porous ceramic coating, heating the coated substrate to a temperature between 1400° F. to 2000° F. while contacting the coated substrate with a gas mixture containing an amount of fluorine sufficient to attack the interface between the metallic substrate and the ceramic coating in preference to attacking the coating so as to thereby remove the ceramic coating by spallation without completely dissolving the coating and without significantly attacking the substrate, said coating removal occurring in less time than that required for complete coating dissolution under the same conditions.

4,889,590

SEMICONDUCTOR PRESSURE SENSOR MEANS AND METHOD

Robert L. Tucker, Phoenix, and Joseph M. Staller, Tempe, both of Ariz., assignors to Motorola Inc., Schaumburg, Ill.

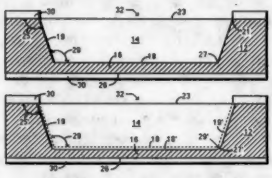
Filed Apr. 27, 1989, Ser. No. 343,986

Int. Cl.[4] H01L *21/306;* **B44C** *1/22;* **C03C** *15/00, 25/06*

U.S. Cl. 156—647 **20 Claims**

1. A process for forming etched cavity devices comprising: providing a substrate having first and second opposed faces;

anisotropically etching a cavity in the substrate from the first face to form a diaphragm adjacent the second face;



isotropically etching the cavity to increase the diaphragm rupture pressure for pressure applied to the first face.

4,889,591

CROTALARIA JUNCEA PAPER PULPS

Eduardo J. Villavicencio, Mexico City, Mexico, and Camilo Gomez-Estevez, Calli, Colombia, assignors to Process Evaluation and Development Corporation, Dallas, Tex.

Filed May 27, 1988, Ser. No. 199,804
Int. Cl.[4] D21B *1/14*
U.S. Cl. 162—20 **20 Claims**

1. A method for producing a paper pulp using *Crotalaria juncea* as the primary source of long fiber comprising:

a. harvesting said *Crotalaria juncea;*

b. reducing the moisture content of the *Crotalaria juncea* to less than about 30 percent by weight;

c. reducing the size of the pieces of said *Crotalaria juncea* to smaller fragments;

d. shredding and depithing said *Crotalaria juncea* at its ambient moisture level;

e. washing the depithed *Crotalaria juncea;*

f. wet depithing the washed *Crotalaria juncea;*

g. contacting the washed and depithed *Crotalaria juncea* fibers with an aqueous solution comprising sodium hydroxide containing at least about 8 percent by weight sodium hydroxide at a temperature of greater than about 180° C. for a first period of time;

h. rapidly reducing the pressure at least about 1 kg/cm^2 with a resulting reduction of temperature and continuing the contact of said *Crotalaria juncea* fibers with said aqueous sodium hydroxide for a second period of time; and

i. recovering a *Crotalaria juncea* paper pulp.

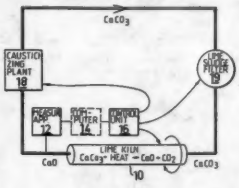
4,889,592

PROCESS AND APPARATUS FOR CONTROL IN BURNING AND SLAKING OF LIME AND CAUSTICIZING

Birgitta S. Andersson, Enebyberg; Malin C. Zethraeus, Johanneshov; Torbjörn Herngren, Älvsjö , and Jan-Erik V. Gustafsson, Täby, all of Sweden, assignors to STFI, Sweden

PCT No. PCT/SE87/00044, § 371 Date Nov. 18, 1987, § 102(e) Date Nov. 18, 1987, PCT Pub. No. WO87/04738, PCT Pub. Date Aug. 13, 1987
PCT Filed Feb. 2, 1987, Ser. No. 110,690
Claims priority, application Sweden, Feb. 11, 1986, 8600597
Int. Cl.[4] D21C *11/04;* C04B *2/04*
U.S. Cl. 162—29 **21 Claims**

1. A method of controlling at least one process step in a lime cycle process that includes the steps of forming burnt lime in a kiln, washing and filtering of lime sludge, and causticizing of green liquor, which lime cycle process steps are carried out under variable operating conditions, said method including the steps of obtaining a value for at least one mechanical property of said burnt lime, said mechanical property being selected from the group consisting of modulus of elasticity and hardness, and adjusting at least one operating condition of said lime



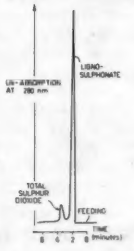
cycle process based on the value obtained of said mechanical property.

4,889,593

METHOD OF DETERMINING RAPIDLY THE CONCENTRATION OF THE TOTAL SULPHUR DIOXIDE AND THE LIGNOSULPHONATE PRESENT IN SULPHITE PULPING PROCESS LIQUORS

Panu Tikka, and Nils E. Virkola, both of Helsinki, Finland, assignors to Oy Advanced Forest Automation Ab, Finland

Continuation of Ser. No. 673,479, Nov. 20, 1984, abandoned. This application Jan. 26, 1988, Ser. No. 149,936
Claims priority, application Finland, Dec. 30, 1983, 834870
Int. Cl.[4] D21C *3/04, 3/06, 3/22, 7/12*
U.S. Cl. 162—49 **3 Claims**



1. A method for controlling a sulphite pulping process wherein the pulping liquor contains compounds of sulphur dioxide and lignosulphonate comprising:

(a) pretreating an ion exclusion column with sulphur dioxide thereby acidifying said column;

(b) separating the compounds forming the total sulphur dioxide concentration from the compounds forming the lignosulphonate concentration of said pulping liquor by passing said liquor through said pretreated column;

(c) spectrophotometrically determining the concentration of said sulphur dioxide by measuring the ultraviolet light absorbance at a wavelength of 280 mm, of the liquid effluent from said column pretreated with said sulphur dioxide;

(d) regulating the pulping temperature and time in response to said determined sulphur dioxide concentration; and

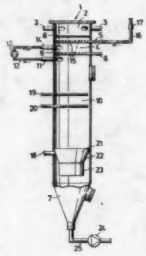
(e) matintaining the column acidity throughout the controlling of the said pulping.

4,889,594

METHOD FOR MANUFACTURING FILLER-CONTAINING PAPER

Gunnar Gavelin, Taby, Sweden, assignor to Mo och Domsjo Aktiebolag, Ornskoldsvik, Sweden

Filed Dec. 3, 1987, Ser. No. 128,653
Claims priority, application Sweden, Dec. 3, 1986, 8605182
Int. Cl.[4] D21F *11/00*
U.S. Cl. 162—130 **19 Claims**



1. A method of manufacturing paper using a paper machine in which stock is fed to a headbox of said machine to form the paper, said method comprising the steps of:

introducing filler and pulp containing a high proportion of pulp fines into a reaction vessel;

mixing said filler with said pulp containing a high proportion of pulp fines in said reaction vessel to form a resultant mixture;

admixing the resultant mixture with retention agent in said reaction vessel to form flocs which contain the filler and said pulp containing a high proportion of pulp fines (co-flocculation);

subjecting the flocs to a size-controlling shearing process in said reaction vessel for breaking down large flocs and agglomerating small flocs to form flocs having a mean particle size in a range of 2 to 4 mm; and

feeding the flocs to the stock upstream of the headbox, wherein the size-controlling shearing process is effected in a shearing zone in the reaction vessel in which the floc suspension is imparted with a helical rotational motion in the flow direction thereby engendering a controllable shearing effect between adjacent layers at varying distances from the center of the rotation.

4,889,595

PROCESS FOR MAKING INDIVIDUALIZED, CROSSLINKED FIBERS HAVING REDUCED RESIDUALS AND FIBERS THEREOF

Carlisle M. Herron; Walter L. Dean, both of Memphis; Danny R. Moore, Germantown; James W. Owens, and Howard L. Schoggen, both of Memphis, all of Tenn., assignors to The Procter & Gamble Cellulose Company, Memphis, Tenn.

Continuation of Ser. No. 879,672, Jun. 27, 1986, abandoned.
This application Mar. 1, 1989, Ser. No. 317,125
The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.
Int. Cl.[4] D21H *5/12*; D06M *1/00*
U.S. Cl. 162—157.6 **13 Claims**

1. A process for making individual, crosslinked, cellulosic fibers, said process comprising the steps of:

a. providing cellulosic fibers and contacting said fibers with a crosslinking agent in an aqueous solution, said crosslinking agent being selected from the group consisting of C_2–C_8 dialdehydes, acid analogues of said dialdehydes derived by having one aldehyde group of each said dialdehyde replaced by a carboxyl group, and oligomers of said dialdehydes and said acid analogues, said fibers being contacted with a sufficient amount of said crosslinking agent that, when said crosslinking agent has been reacted, between about 0.5 mole % and about 3.5 mole % crosslinking agent, calculated on a cellulose anhydroglucose molar basis, reacts with said fibers so that said fibers have a water retention value of from about 28 to about 45;

b. dewatering said fibers to a consistency of from about 30% to about 80% of fibers by weight, and defibrating said fibers into substantially individual form;

c. air drying said fibers while individualized under conditions that obviate fiber to fiber contact and reacting said crosslinking agent with said fibers to form intrafiber crosslink bonds in the substantial absence of interfiber bonds; and

d. reducing the level of unstable and unreacted crosslinking agent on the individualized fibers by washing such fibers with an alkaline solution, said alkaline solution having a pH greater than about 7 and comprising a constituent for decomposing hemiacetal bonds while being neutral towards acetal bonds.

4,889,596

PROCESS FOR MAKING INDIVIDUALIZED, CROSSLINKED FIBERS AND FIBERS THEREOF

Howard L. Schoggen; Jeffrey T. Cook, and Robert M. Bourbon, all of Memphis, Tenn., assignors to The Proter & Gamble Cellulose Company, Memphis, Tenn.

Continuation of Ser. No. 879,678, Jun. 27, 1986, abandoned.
This application Jan. 30, 1989, Ser. No. 303,013
Int. Cl.[4] D21H *5/12*; D06M *1/00*
U.S. Cl. 162—157.6 **17 Claims**

1. A process for making individualized, crosslinked cellulosic fibers, said process comprising the steps of:

a. providing moist cellulosic fibers having a moisture content of at least about 30 wt %;

b. defibrating said fibers to provide said fibers in individual form, and drying said individualized fibers to a moisture content between about 18 and about 30 wt. % under substantially unrestrained conditions;

c. contacting said fibers with a crosslinking solution containing a water-miscible diluent, an amount of water which is insufficient to swell said fibers to a degree of swelling corresponding to fibers having about a 30 wt. % moisture content, and a crosslinking agent, wherein said crosslinking agent is selected from the group consisting of C_2–C_8 dialdehydes, C_2–C_8 dialdehyde acid analogues having at least one aldehyde group, and oligomers of said dialdehydes and dialdehyde acid analogues, and reacting said crosslinking agent with said fibers while said fibers are in contact with said crosslinking solution, in the substantial absence of interfiber bonds, to form interfiber crosslink bonds, said fibers being contacted with a sufficient amount of said crosslinking agent such that between about 0.5 mole % to about 3.5 mole % of crosslinking agent, calculated on a cellulose anhydroglucose molar basis, reacts with said fibers to form said interfiber crosslink bonds; and

d. defibrating said fibers and drying said fibers into substantially individual form and drying said individualized fibers under substantially unrestrained conditions, said individualized fibers having a water retention value of from about 28 to about 60.

4,889,597

PROCESS FOR MAKING WET-LAID STRUCTURES CONTAINING INDIVIDUALIZED STIFFENED FIBERS

Robert M. Bourbon, and John J. Ryan, Jr., both of Memphis, Tenn., assignors to The Procter & Gamble Cellulose Company, Memphis, Tenn.

Continuation of Ser. No. 879,673, Jun. 27, 1986, abandoned. This application Mar. 1, 1989, Ser. No. 317,124

The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.

Int. Cl.[4] D21H *5/12*; D06M *13/12*

U.S. Cl. 162—157.6 4 Claims

1. A process for continuously making a fibrous sheet comprising crosslinked cellulosic fibers which characteristically flocculate in an aqueous slurry and which have a high propensity for flocculating when an aqueous slurry of said fibers is deposited on a forming wire in a papermaking-type apparatus, said process comprising the steps of:

a. providing an aqueous fibrous slurry comprising said fibers and water, said fibers having been air dried and crosslinked while individualized and unrestrained with a crosslinking agent selected from the group consisting of C_2–C_8 dialdehydes, C_2–C_8 dialdehyde acid analogues having at least one aldehyde group, and oligomers of said dialdehydes and dialdehyde acid analogues, said fibers having been contacted with a sufficient amount of said crosslinking agent that between about 0.5 mole % and about 3.5 mole % of crosslinking agent, calculated on a cellulose anhydroglucose molar basis, have been reacted with said fibers to form intrafiber crosslink bonds, and so that said fibers have a water retention value of from about 25 to about 60;

b. depositing said slurry on a traveling foraminous forming wire in a papermaking-type apparatus whereupon the free water in said slurry drains through said traveling foraminous forming wire;

c. downwardly directing a plurality of showers of water directly onto the slurry as draining progresses, said showers being oriented in the cross machine direction and being spaced from each other in the machine direction, said showers also being of progressively lesser flow rates and velocities but having sufficient flow rates and velocities to substantially disperse flocculations of said fibers and inhibit further formation of flocculations of said fibers to provide said fibers in substantially unflocculated form; and then

d. setting said fibers in sheeted form while said fibers are substantially unflocculated by pressing them against said formation wire with a screen covered cylindrical roll.

4,889,598

METHOD FOR DETACHING A WEB FROM A SURFACE OF A ROLL WITH INDUCTIVE HEATING

Juhani Niskanen, Muurame, Finland, assignor to Valmet Paper Machinery, Inc., Finland

Filed Jan. 25, 1988, Ser. No. 147,695

Claims priority, application Finland, Jan. 23, 1987, 870309

Int. Cl.[4] D21F *3/00*

U.S. Cl. 162—199 26 Claims

1. Method for detaching a moist paper web from a surface of a roll, comprising the steps of:

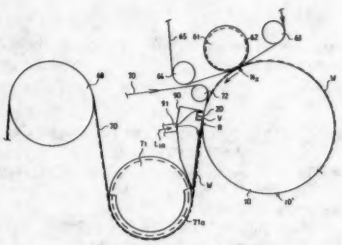
detaching the web from said roll surface,

directing a heating effect at the web from outside the roll and within a vicinity of a point of detachment of the web off the roll, said vicinity being at said detachment point or immediately upstream thereof in a direction of web travel, and

thereby heating water which is present between the web and the roll surface within the vicinity of the detaching point, so as to detach the web from the roll surface,

wherein the directing of heating is locally applied to the web for just a short period of time in the vicinity of the detaching point as the web passes thereby, so that the water is locally heated within said vicinity, and providing a mantle on said roll or an outer coating on a mantle of said roll, said mantle or coating being a material which is at least partially magnetically conductive,

wherein said directing step comprises



applying an inductive heating effect to said roll mantle without contact and with a sufficiently high frequency so that depth of penetration of the heating effect into the roll mantle remains low so as to locally raise the surface temperature of the roll at the detaching point.

4,889,599

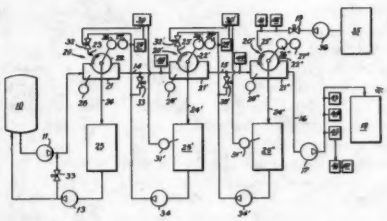
APPARATUS FOR CONTINUOUSLY MEASURING THE SODA LOSS IN A PULP WASHING SYSTEM

Khaim Lisnyansky, Chester, and William E. Blecha, Warwick, both of N.Y., assignors to International Paper Company, Purchase, N.Y.

Division of Ser. No. 940,268, Dec. 11, 1986, Pat. No. 4,746,405, which is a division of Ser. No. 646,416, Aug. 31, 1984, abandoned. This application Jan. 14, 1988, Ser. No. 144,538

Int. Cl.[4] D21C *9/02*, *9/06*

U.S. Cl. 162—263 1 Claim



1. An apparatus for continuously measuring the soda loss in a high consistency pulp discharge slurry of a pulp washing system, comprising:

(a) means for measuring the soda concentration of the liquor in the high consistency pulp discharge slurry, further comprising,

(1) a sampling device for removing a portion of the liquor from the slurry after the last washing stage,

(2) a containment member connected to the sampling device which receives the liquor removed from said slurry and therein separates the liquor from air and liquor from residual fiber, and

(3) a measuring device for insertion into the sample liquor in the containment member below the top surface of the sample liquor to measure the soda concentration of the sample liquor to produce a first signal, S_o;

(b) means for measuring the soda concentration in the shower liquor added to the last stage of the washing system to produce a second signal, S_s;

(c) means for measuring the pulp consistency in the high

consistency pulp discharge slurry to produce a third signal, C_o;

(d) means responsive to the first, the second and the third signals for determining system soda loss (SL) according to the expression,

$$SL=(S_o-S_2)\,(1-C_o)/C_o$$

to produce a fourth signal which represents the soda loss of the washing system.

4,889,600

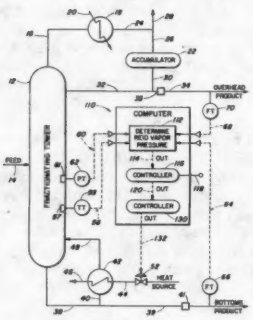
FRACTIONATING COLUMN CONTROL APPARATUS AND METHODS

Patricia A. Meier; W. Jeff Meier, both of Ponca City, Okla., and Brent J. Woodland, Billings, Mont., assignors to Conoco Inc., Ponca City, Okla.

Filed Feb. 16, 1988, Ser. No. 155,787

Int. Cl.[4] B01D *3/14, 3/42*

U.S. Cl. 203—2 **5 Claims**



1. Apparatus for separating a mixture of hydrocarbons into discrete products, comprising:

a fractionating column;

means for providing heat to said fractionating column;

means for feeding a stream of said mixture of hydrocarbons to said fractionating column whereby said stream is fractionated into an overhead product stream and a bottoms product stream; and

means for controlling the Reid vapor pressure of said bottoms product stream, including:

means for establishing a first signal representative of the actual temperature of said bottoms product stream;

means for establishing a second signal representative of the actual vapor pressure of said bottoms product stream;

means for establishing a third signal representative of the actual rate of flow of said bottoms product stream;

means for establishing a fourth signal representative of the actual rate of flow of said overhead product stream;

means for establishing a fifth signal representative of the actual Reid Vapor Pressure of said bottoms product stream in response to said first, second, third and fourth signals without an analysis of said bottoms product stream;

means for establishing a sixth signal representative of the desired Reid Vapor Pressure of said bottoms product stream;

means for comparing said fifth signal and said sixth signal and for establishing a seventh signal responsive to the difference between said fifth signal and said sixth signal; and

means responsive to said seventh signal for varying the rate at which heat is provided to said fractionating column to maintain said actual Reid Vapor Pressure of said bottoms product stream.

3. A method for determining the Reid Vapor Pressure of a bottoms product stream of a fractionating column used for fractionating a multi-component hydrocarbon feed stream into an overhead product stream and a bottoms product stream, comprising:

establishing a first signal representative of the temperature of said bottoms product stream;

establishing a second signal representative of the vapor pressure of said bottoms product stream;

establishing a third signal representative of the rate of flow of said bottoms product stream;

establishing a fourth signal representative of the rate of flow of said overhead product stream;

determining said Reid Vapor Pressure of said bottoms product stream in response to said first, second, third and fourth signals without an analysis of said bottoms product stream; wherein said step of determining said Reid Vapor Pressure of said bottoms product stream in response to said first, second, third and fourth signals without an analysis of said bottoms product stream comprises the step of determining said Reid Vapor Pressure of said bottoms product stream in response to said first, second, third and fourth signals without an analysis of said bottom product stream based on the following relationship;

$$\text{Reid Vapor Pressure}=A+B\,(X^E-C(Y)+D/Z$$

wherein:

X equals the temperature of said bottoms product stream as represented by said first signal;

Y equals the vapor pressure of said bottoms product stream as represented by said second signal;

Z equals the rate of flow of said overhead product stream as represented by said fourth signal divided by the rate of flow of said bottoms product stream as represented by said third signal; and

A, B, C, D, and E equal fitted constants.

4,889,601

SELECTIVE ABSORPTION FILM OF A SOLAR HEAT COLLECTOR

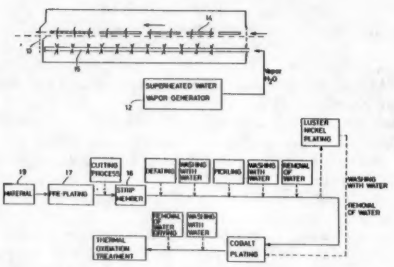
Nobushige Arai, Kitakatsuragi, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 903,787, Sep. 5, 1986, Pat. No. 4,777,936, which is a division of Ser. No. 530,264, Sep. 8, 1983, Pat. No. 4,637,374. This application Aug. 2, 1988, Ser. No. 227,115

Claims priority, application Japan, Sep. 8, 1982, 57-156429; Sep. 24, 1982, 57-166857; Nov. 30, 1982, 57-210357; Nov. 30, 1982, 57-181732

Int. Cl.[4] F24J *2/48;* **C25D** *5/50*

U.S. Cl. 204—37.1 **14 Claims**



1. A method of making a selective absorption film comprising:

forming a cobalt film on at least one surface of a metal article

comprising iron or copper so as to form a cobalt coated article; and

treating said article at an oxidizing temperature of from 350° to 400° C. for an oxidizing time period of from 30 to 120 minutes in a furnace containing an oxidizing atmosphere while supplying water vapor from a superheated water vapor generator to the furnace so as to carry out oxidation of said cobalt film thereby producing a selective absorption film having an absorption rate of from 0.91 to 0.96 and a radiation rate of from 0.08 to 0.10.

4,889,602

ELECTROPLATING BATH AND METHOD FOR FORMING ZINC-NICKEL ALLOY COATING

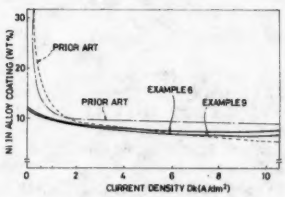
Katsuhide Oshima, Tokyo; Toshiaki Murai, Chiba; Hitoshi Sakurai, Matsudo; Shuji Igarashi, Hino; Haruo Hanagata, Ebina, and Hidesato Igarashi, Tokyo, all of Japan, assignors to Dipsol Chemicals Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 37,863, Apr. 13, 1987, abandoned. This application Apr. 25, 1988, Ser. No. 186,788

Claims priority, application Japan, Apr. 14, 1986, 61-85253; Jun. 4, 1986, 61-129447

Int. Cl.[4] C25D *3/56, 5/48*

U.S. Cl. 204—38.1 **39 Claims**



1. An electroplating bath for forming a zinc-nickel alloy coating consisting essentially of water, about 1 to 70 grams/liter of zinc, about 0.6 to 118 grams per liter of nickel, at least one component from the group consisting of (i) aliphatic amines in an amount not more than 16 grams/liter (ii) polymers of aliphatic amines in an amount not more than about 20 grams per liter, said at least one component being in an effective amount so that the electrodeposited zinc-nickel alloy coating electrodeposited from said bath has a substantially uniform zinc-nickel alloy ratio, said bath having a pH of more than 11.

18. The electroplating method for forming a zinc-nickel alloy coating on an electrically conductive metallic matrix material comprising electrolytically depositing a zinc-nickel alloy coating on the matrix material from an electroplating bath consisting essentially of water, about 1 to 70 grams/liter of zinc, about 0.6 to 118 grams per liter of nickel, at least one component from the group consisting of (i) aliphatic amines in an amount not more than 16 grams/liter, (ii) polymers of aliphatic amines in an amount not more than about 20 grams per liter and (iii) a compound selected from the group consisting of hydroxyaliphatic carboxylic acids and salts thereof in amount not more than 2 mols/liter, said at least one component being in an effective amount so that the electrodeposited zinc-nickel alloy coating electrodeposited from said bath has a substantially uniform zinc-nickel alloy ratio, said bath having a pH of more than 11.

36. The electroplating method for forming a chromate coating on a zinc-nickel alloy coating deposited electrolytically on electrically conductive metallic matrix material comprising electrolytically depositing a zinc-nickel coating on the matrix material from an electroplating bath consisting essentially of water, about 1 to 70 grams/liter of zinc, about 0.6 to 118 grams per liter of nickel, at least one component from the group consisting of (i) aliphatic amines in an amount not more than 16 grams/liter, (ii) polymers of aliphatic amines in an amount not more than about 20 grams per liter and (iii) a compound selected from the group consisting of hydroxyaliphatic carboxylic acids and salts thereof in amount not more than 2 mols/liter, said at least one component being in an effective amount so that the electrodeposited zinc-nickel alloy coating electrodeposited from said bath has a substantially uniform zinc-nickel alloy ratio, said bath having a pH of more than 11, and forming a chromate coating on the zinc-nickel alloy coating by means of a chromate treatment.

4,889,603

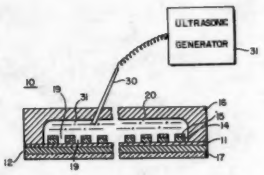
METHOD OF ELIMINATING GAS BUBBLES IN AN ELECTROPHORETIC DISPLAY

Frank J. DiSanto, North Hills; Denis A. Krusos, Lloyd Harbor, and Frederic E. Schubert, Shorehan, all of N.Y., assignors to Copytele, Inc., Huntington Station, N.Y.

Filed Dec. 9, 1988, Ser. No. 281,701

Int. Cl.[4] G09G *3/34;* G02F *1/00*

U.S. Cl. 204—180.1 **10 Claims**



1. A method of eliminating gas bubble formation in an electrophoretic display of the type containing an electrophoretic dispersion including pigment particles suspended in a suitable solution, comprising the step of:

agitating said dispersion at a given frequency rate to cause captured gas bubbles to migrate from said dispersion prior to placing said dispersion into said display said given frequency rate being at a frequency of 40 KHZ with a 1000 Watt ultrasonic probe and for a duration between 1–1.5 minutes.

4,889,604

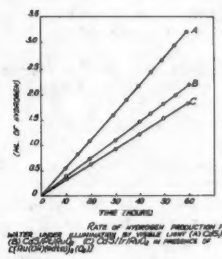
PROCESS FOR THE PHOTOCATALYTIC DECOMPOSITION OF WATER INTO HYDROGEN AND OXYGEN

M. M. Taqui Khan, and R. Chandra Bhardwaj, both of Gujarat, India, assignors to Council of Scientific & Industrial Research, New Delhi, India

Filed Aug. 6, 1987, Ser. No. 82,816

Int. Cl.[4] C25B *1/02*

U.S. Cl. 204—157.5 **11 Claims**



1. A process for the photocatalytic decomposition of water into hydrogen and oxygen which comprises loading a semicon-

ductor having a hexagonal crystal structure with a metal selected from Pt, Rh, Ir and In and a transition metal oxide, suspending the loaded semiconductor in an aqueous solution of dioxygen complex of ruthenium, passing light through the suspended loaded semiconductor maintained under an inert atmosphere and separating the hydrogen and oxygen so formed.

4,889,605

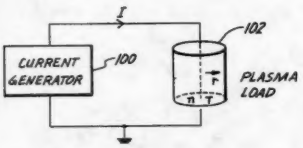
PLASMA PINCH SYSTEM

John F. Asmus, La Jolla, and Ralph H. Lovberg, San Diego, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Dec. 7, 1987, Ser. No. 129,152

Int. Cl.[4] H01S 3/09

U.S. Cl. 204—157.44 **12 Claims**



1. A method of generating a plasma pinch, comprising:

using a pair of spaced apart combination liquid emitter and electrode means, and combination liquid receptor and electrode means;

flowing between said pair of electrode means a fine stream of liquid under sufficient pressure in a substantially narrow, straight and focused configuration, to cause the formation thereabout of a tenuous liquid vapor preconditioning cloud surrounding the flowing fine stream of liquid;

establishing an electrical voltage potential difference between said electrode means of a sufficient high voltage to cause electrical current to flow through said liquid vapor cloud for establishing initially a low density plasma therealong sufficient to emanate energy therefrom to said flowing liquid stream to heat it sufficiently to cause it to become ionized and to be converted into a high density plasma in response to said low density plasma.

4,889,606

ELECTROPHORESIS AND TRANSFER FOR

Nicholas J. Dyson, Pinner; David P. Pashby, Abbots Langley, and Judith M. Parke, Great Missenden, all of England, assignors to Amersham International plc, Buckinghamshire, England

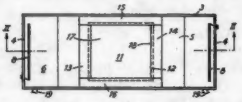
Filed Oct. 19, 1988, Ser. No. 259,646

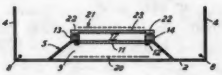
Claims priority, application United Kingdom, Oct. 20, 1987, 8724528

Int. Cl.[4] G01N 27/28, 27/26

U.S. Cl. 204—182.8 **18 Claims**

1. A method for use in biological testing, said method comprising making up a sandwich structure comprising an electrophoresis gel and a membrane subjecting a sample to a first stage of electrophoresis in which macromolecules contained within the sample are drawn out of a reservoir containing the sample by means of a first electric field and are distributed along the electrophoresis gel at spaced positions dependent upon their size and/or charge, thence subjecting the distributed macromolecules within the gel to a second stage of electrophoresis in which the distributed macromolecules are transferred to the membrane by means of a second electric field transverse to the





first electric field, and thence separating the membrane and the gel.

4,889,607

METHOD OF PRODUCING THE MAGNETIC METALLIC LAYERS HAVING A LOW THERMAL COEFFICIENT OF EXPANSION

Kurt H. J. Buschow, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 2, 1988, Ser. No. 239,739

Claims priority, application Netherlands, Sep. 14, 1987, 8702180

Int. Cl.[4] C23C 14/34

U.S. Cl. 204—192.15 **3 Claims**

1. A method of producing thin layers of a magnetic, metallic material having a low thermal coefficient of expansion on a substrate, characterized in that the layers have a hard magnetic, stable intermetallic component with a tetragonal crystal structure of the $ThMn_{12}$-type, and that the magnetic, metallic material, the composition of which is defined by the formula $REFe_{12-x}T_x$, wherein RE is an element selected from the group consisting of Nd, Sm, Gd, Tb, Dy, Ho, Er, Tm, Lu and Y, wherein T is an element selected from the groups consisting of Si, Ti, V, Cr, Mo and W, and wherein $1<x4$, is applied by means of a sputter deposition technique from the vapor phase.

4,889,608

ELECTRODE SYSTEM

Guenter Eickmann, Grove City, Pa., assignor to Pine Instrument Company, Grove City, Pa.

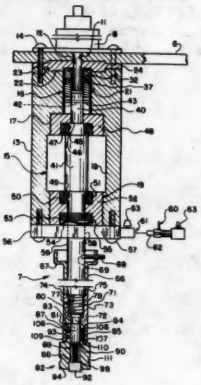
Filed Feb. 10, 1987, Ser. No. 12,885

Int. Cl.[4] C25B 9/02; G01N 27/46

U.S. Cl. 204—212 **25 Claims**

1. A quick change electrode assembly for immersion in an electrolytic fluid comprising an arbor, an adaptor mounted on the arbor and having a first bore extending therethrough, a contact stud mounted on and in electrical contact with the arbor, a disc holder partially inserted in and sealed to the first bore of the adaptor, said disc holder having a bore receiving the contact stud at one end and frictionally receiving an elec-

trode disc in a fluid tight interference seal at the other end and a spring secured to the contact stud and extending through the



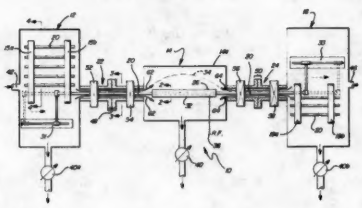
disc holder bore into engagement with the electrode disc to complete a conductive path therebetween.

4,889,609

CONTINUOUS DRY ETCHING SYSTEM

Vincent D. Cannella, Birmingham, Mich., assignor to Ovonic Imaging Systems, Inc., Troy, Mich.

Filed Sep. 6, 1988, Ser. No. 240,861
Int. Cl.[4] C23C *14/56*; C23F *1/02*
U.S. Cl. 204—298 **16 Claims**



1. A system for dry etching an etchable material from a substrate, said system comprising:

an etching chamber including means for establishing a dry etching process therein from a first etching process gas for dry etching said etchable material from said substrate;

a substrate chamber including means for storing said substrate and means for receiving at least a second gas;

first coupling means for coupling the interior of said substrate chamber with the interior of said etching chamber to provide a passageway therebetween for said substrate, said passageway being adopted to remain open during the dry etching of said etchable material from said substrate;

transport means for advancing said substrate from said substrate chamber into said etching chamber through said first coupling means; and

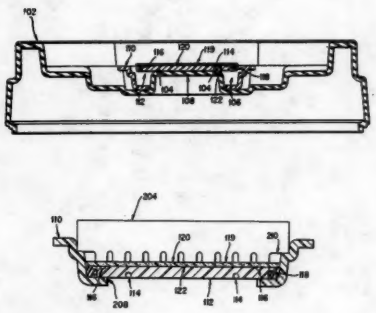
means for maintaining substantially unidirectional gas flow of said second gas through said first coupling means from said substrate chamber to said etching chamber.

4,889,610

POP UP ELECTROPHORESIS APPARATUS AND METHOD

Robert W. Flesher, Baltimore; Mark S. Berninger, Gaithersburg, and Robert W. Blakesley, Frederick, all of Md., assignors to Life Technologies, Inc., Gaithersburg, Md.

Filed Jul. 15, 1988, Ser. No. 219,930
Int. Cl.[4] G01N *27/28, 27/26*
U.S. Cl. 204—299 R **20 Claims**



1. An electrophoresis apparatus for forming a gel from a gelable liquid and for performing an electrophoresis process involving the gel, said electrophoresis apparatus comprising:

a gel casting deck, said gel casting deck comprising a casting tray and a casting plate; and

an electrophoresis tank;

wherein said casting plate when mated with said casting tray forms a substantially liquid-tight mold for containing the gelable liquid during a gelation process;

said plate being separable from said casting tray so that after the gelation process has occurred, the casting plate can be removed with the gel intact; and

wherein said gel casting deck is placed within said electrophoresis tank, said gelation process occurs, and after said gelation process occurs, said casting plate is separated from said casting tray, leaving said casting plate and said gel within said electrophoresis tank.

4,889,611

FLOW CELL

William M. Blough, Jr., Brea, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Continuation of Ser. No. 50,844, May 15, 1987, abandoned. This application Nov. 23, 1988, Ser. No. 277,477
Int. Cl.[4] G01N *27/26*
U.S. Cl. 204—411 **17 Claims**

1. An improved ion selective electrode flow cell comprising:

a first fluid conduit;

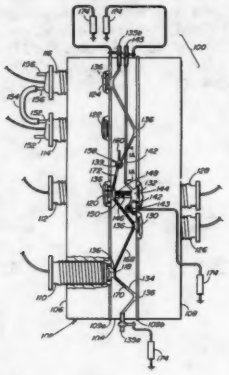
at least two ion sensing electrodes each having an ion sensing surface disposed within the first fluid conduit;

a second fluid conduit;

an ion sensing electrode having an ion sensing surface disposed within the second conduit;

an electrically conducting bridge connecting the first and second fluid conduits; and

a conductive member other than electrodes, having at least portions thereof disposed in the first fluid conduit proxi-



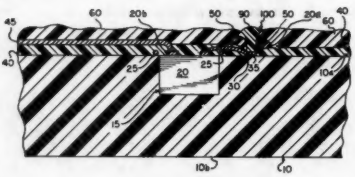
mate the ion sensing surfaces of the at least two ion sensing electrodes and the bridge.

4,889,612

ION-SELECTIVE ELECTRODE HAVING A NON-METAL SENSING ELEMENT

Jill M. Geist, Wildwood; Messner Scott C., and Thomas G. Schapira, both of Lindenhurst, all of Ill., assignors to Abbott Laboratories, North Chicago, Ill.

Filed May 22, 1987, Ser. No. 53,446
Int. Cl.[4] G01N *27/30*
U.S. Cl. 204—416 **8 Claims**



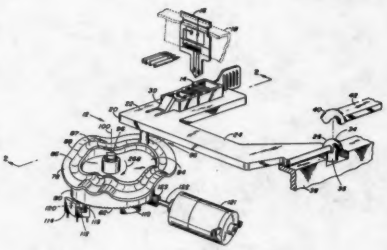
1. An ion-selective electrode comprising:
an electrically insulating substrate having a substantially planar first surface;
a non-metallic conductor coupled to said substrate, said non-metallic conductor comprising graphite;
means, affixed to said first surface and coupled to said conductor, for sensing a potential located at a situs free of metallization, said means for sensing comprising a non-metallic conductive layer and an exposed ion-selective membrane covering said conductive layer; and
an electrically insulating layer covering a portion of said conductor, said electrically insulating layer comprising:
a first stratum affixed to said first surface;
a second stratum wherein at least a portion thereof is intersolubilized with said membrane; and
a third stratum covering said second stratum.

4,889,613

ANALYTICAL APPARATUS, ELECTRODE AND SAMPLE CONTAINER FOR USE THEREWITH

Jack D. McNeal, Long Beach; Mark Levine, Irvine, and J. Harvey Beery, La Habra, all of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Sep. 11, 1987, Ser. No. 96,099
Int. Cl.[4] G01N *27/28, 27/30*
U.S. Cl. 204—416 **35 Claims**



1. An ion selective electrode assembly comprising:
a substrate;
a plurality of conductive members deposited upon the substrate;
an insulating layer applied over the conductive members and fixed to the substrate, the insulating layer including openings exposing at least a portion of each conductive member;
ion selective means deposited over one of the conductive members exposed by the insulating layer;
reference electrode means deposited over a second one of the conductive members exposed by the insulating layer;
a well formed by the substrate and insulating layer, the well including the reference electrode means;
a reference medium disposed in such well and in contact with the reference electrode means; and
a cover disposed over the well for sealing the reference medium within the well.

11. A sample container comprising:
first and second fluid reservoirs;
absorbing means proximate the first and second fluid reservoirs, the reservoirs and absorbing means forming an integral unit;
a third fluid reservoir proximate the second fluid reservoir and a notch formed between the second and third fluid reservoirs.

23. An analytical apparatus for use with a sensing assembly and a sample container comprising:
support means for receiving and removably retaining the sensing assembly;
a support table adapted to removably retain the sample container;
pivot means for pivoting the support table about horizontal and vertical axes;
a cam including a cam surface;
means for engaging the cam surface and coupling motion described by the cam surface to the support table; and
means for driving the cam.

4,889,614

METHODS FOR RETARDING COKE FORMATION DURING PYROLYTIC HYDROCARBON PROCESSING

David R. Forester, Conroe, Tex., assignor to Betz Laboratories, Inc., Trevose, Pa.

Filed May 9, 1989, Ser. No. 349,014
Int. Cl.[4] C07C *3/30*
U.S. Cl. 208—48 AA **16 Claims**

1. A method of inhibiting the formation and deposition of pyrolytic coke on the heated metal surfaces of the structural

and associated parts of a pyrolysis furnace which is being used to crack a petroleum feedstock to produce lower and/or olefinic hydrocarbon fractions, which method comprises adding to the feedstock a coke inhibiting amount of a compound selected from the group consisting of calcium acetate, magnesium acetate, magnesium nitrate and calcium nitrate.

4,889,615

ADDITIVE FOR VANADIUM CAPTURE IN CATALYTIC CRACKING

Arthur A. Chin, Cherry Hill; Ivy D. Johnson, Medford, both of N.J.; Charles T. Kresge, Westchester, Pa., and Michael S. Sarli, Haddonfield, N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 6, 1988, Ser. No. 280,451
Int. Cl.[4] C10G *11/18*
U.S. Cl. 208—113 20 Claims

1. A catalytic cracking process for the conversion of a high boiling hydrcarbon feedstock containing a vanadium contaminant by circulating a cracking catalyst in a cracking zone, a disengaging zone and a regeneration zone, contacting the feedstock in the cracking zone under catalytic cracking conditions with a solid, particulate cracking catalyst to produce cracking products of lower molecular weight while depositing carbonaceous material on the particles of cracking catalyst, separating the particles of cracking catalyst from the cracking products in the disengaging zone and oxidatively regenerating the cracking catalyst by burning off the deposited carbonaceous material in a regeneration zone, in which the cracking is carried out in the presence of solid particles of an additive composition comprising at least one magnesium-aluminum hydrotalcite which is present in an amount sufficient to passivate the vanadium from the feed.

4,889,616

OCTANE BOOSTING

James G. Miller, Pearl River; Regis J. Pellet, Croton; Edwar S. Shamshoum, Lake Peekskill, and Jule A. Rabo, Armonk, all of N.Y., assignors to UOP, Des Plaines, Ill.

Division of Ser. No. 58,241, Jun. 4, 1987, Pat. No. 4,803,185.
This application Oct. 24, 1988, Ser. No. 261,581
Int. Cl.[4] C10G *11/04*
U.S. Cl. 208—114 10 Claims

1. In a process involving the cracking of a petroleum fraction to a lower boiling material by subjecting the petroleum fraction to catalytic cracking conditions in the presence of a petroleum cracking catalyst and an octane boosting catalyst the improvement which comprises employing as the octane boosting catalyst a composite of an intermediate pore non-zeolitic molecular sieve in combination with another NZMS having the same framework structure.

4,889,617

METHOD OF SUPPRESSING SODIUM POISONING OF CRACKING CATALYSTS DURING FLUID CATALYTIC CRACKING

Alan R. English, Point Richmond, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 24, 1986, Ser. No. 843,463
Int. Cl.[4] C10G *11/18*
U.S. Cl. 208—121 9 Claims

1. A cracking process which comprises contacting a hydrocarbonaceous feed containing sodium contaminants with a cracking catalyst or employing catalyst with sodium contaminants under cracking conditions, without added hydrogen, to produce a product fraction lighter than the feed in the cracking system, including a reactor and a catalyst regeneration zone in which the catalyst is circulated from the reactor to the regeneration zone and back to the reactor, wherein a passivating agent consisting essentially of tin is present in the cracking process in an amount sufficient to reduce the contaminating effect of the sodium deposited on the catalyst by the feed.

4,889,618

TREATMENT OF CATALYST FINES-OIL MIXTURES

William H. Tyson, Jr., 1874 School St., Moraga, Calif. 94556, and Frank A. Stuart, 631 Zinnia Ct., Sonoma, Calif. 95476

Filed Nov. 28, 1988, Ser. No. 276,624
Int. Cl.[4] C10G *19/02, 35/00*
U.S. Cl. 208—162 7 Claims

1. A process for treating slurry oil-catalyst fines mixtures produced in the course of cracking petroleum by the fluid catalytic cracking process which comprises:

(a) forming a dispersion of the oil-fines mixture in a treating agent consisting essentially of a concentrated aqueous solution of a compound selected from the group consisting of alkali metal hydroxides, alkali metal carbonates, alkali metal phosphate and alkali metal borates, the quantity of treating agent employed being substantially greater than the quantity of oil-fines mixture employed in forming the dispersion;

(b) subjecting the resulting dispersion to vigorous mixing while holding the dispersion at a temperature above 170° F.;

(c) discontinuing the mixing and settling the dispersion while maintaining the temperature above 170° F. to form an upper oil phase substantially free of catalyst fines and a lower aqueous phase containing catalyst fines; and

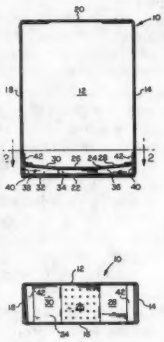
(d) recovering the oil phase.

4,889,619

PACKAGE WITH A CRUMB TRAP

Bobby R. Lynch, R.R. 2, Box 57, Ozark, Mo. 65721

Filed Jun. 27, 1988, Ser. No. 211,834
Int. Cl.[4] B07B *1/46*
U.S. Cl. 209—374 3 Claims



1. A package for containing frangible particulate material, said package comprising: an outer box having a frusto conical upright peripheral wall and a bottom closure wall attached to the bottom end of said peripheral wall, said walls being made of imperforate material, and a one-piece partition member extending entirely across a bottom portion of said outer box to an inside surface of said peripheral wall, said partition member being supported in a spaced relationship above said bottom closure wall by means of a frusto conical bolstering wall section depending from the periphery thereof to said bottom closure wall, said partition member having a circular screening section and an annular ramp section attached to a peripheral portion of said screening section, said ramp section extending from said screening section in an upwardly direction to said inside surface, and said screening section and ramp section being concentric with the upright peripheral wall.

4,889,620

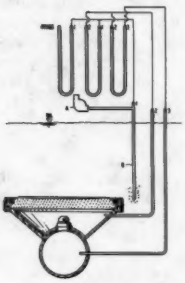
IN PLACE GAS CLEANING OF DIFFUSION ELEMENTS

Frank L. Schmit, Port Washington; David T. Redmon, Racine, and Lloyd Ewing, Bayside, all of Wis., assignors to Water Pollution Control Corporation, Milwaukee, Wis.

Continuation of Ser. No. 426,041, Sep. 28, 1982, abandoned, which is a division of Ser. No. 203,834, Nov. 4, 1980, Pat. No. 4,382,867, which is a continuation-in-part of Ser. No. 191,974, Sep. 29, 1980, abandoned. This application Feb. 6, 1985, Ser. No. 698,973

Int. Cl.[4] C10J *1/08*; B08B *3/00*; C02F *3/20*

U.S. Cl. 210—137 20 Claims



1. Liquid treatment apparatus comprising:

a gas distribution network in a tank;

means for introducing treating gas into said network;

a source of cleaning gas;

means including valve means for intermittently introducing into said network said cleaning gas alone or in admixture with the treating gas;

a plurality of flow regulating means distributed about a submerged portion of the network for receiving the aforementioned gases and for discharging them into a plurality of plenums downstream of the flow regulating means, said flow regulating means tending to promote gas flow into said plenums at similar rates; and

a plurality of at least ten multi-pore area release diffusion elements sealingly engaged and in communication with said plenums for receiving said gases, and diffusion elements being members which comprise a multiplicity of closely spaced fine pores defining paths for discharge of said gases and which exhibit an increase in dynamic wet pressure and/or bubble release pressure as a result of deposition of foulants, each of said diffusion elements being in communication with its own individual flow regulating means through its own individual plenum downstream of the flow regulating means, whereby said flow regulating means tend to promote gas flow through said diffusion elements at similar rates.

4,889,621

OIL STRAINER FOR AN AUTOMATIC TRANSMISSION

Yoshihiro Yamada, Anjo; Ryoichi Shirai, Okazaki, and Youichi Hayakawa, Toyoake, all of Japan, assignors to Aisin Aw Co., Ltd., Anjo, Japan

Filed Jan. 4, 1989, Ser. No. 293,393

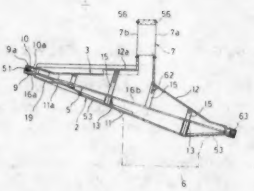
Claims priority, application Japan, Jul. 25, 1988, 63-185735

Int. Cl.[4] F01M *0/00*

U.S. Cl. 210—168 3 Claims

1. An oil strainer for use with an automatic transmission, comprising a suction side body having a suction section, a discharge side body having a discharge section, and a filter element interposed between the two bodies, wherein the improvement comprises:

the two bodies which are constructed with an angled cross section to provide a deep suction section and a deep discharge section, and have peripheral edge sections mutually contacted to form an oiltight structure, and a bottom surface from which a plurality of supporting bosses are projected; and



the filter element which has a peripheral edge section interposed between the peripheral edge sections of the two bodies and a central section supported by the supporting bosses, and is secured between the two bodies and slanted at a prescribed angle with respect to the suction section and the discharge section.

4,889,622

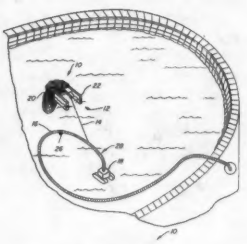
SWIMMING POOL SKIMMER

William J. Newcombe-Bond, Durban, South Africa, assignor to Graham Mervyn Elliott, Durban, South Africa

Filed Sep. 1, 1988, Ser. No. 239,230

Int. Cl.[4] E04H *3/20*

U.S. Cl. 210—169 1 Claim



1. A towed swimming pool skimmer in combination with a submerged automatic suction pool cleaner comprising a pair of floatable laterally spaced elongated elements arranged in spaced apart parallel relation and defining a channel therebetween defining a forward open inlet for receiving debris floating in the pool attendant to the skimmer being towed across the pool,

said skimmer having a rear outlet,

a skeletal frame having rods extending transverse of the elements for holding them apart and attached thereto,

a fore and aft extending rod connected to said transversely extending rods providing a towing line attachment structure, a line connecting said attachment structure and a pipe of said pool cleaner,

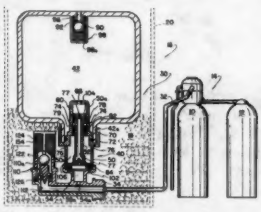
and a mesh collector bag slipped over said elements located rearwardly at said outlet for collecting the debris passing in the channel through said outlet.

4,889,623

BRINING SYSTEM

William C. Prior, Chagrin Falls; Ellis, III: George S., Chardon, and David W. Crozier, Highland Heights, all of Ohio, assignors to Kinetico, Inc., Newbury, Ohio

Filed Nov. 2, 1987, Ser. No. 115,713
Int. Cl.[4] C02B *1/22*
U.S. Cl. 210—190 13 Claims



1. A brining system, comprising:
(a) a brine reservoir including a supply of salt;
(b) a brine valve assembly disposed inside of said reservoir and comprising:
(i) a control valve including an inlet port through which brine solution is drawn from said reservoir during a regeneration cycle;
(ii) said control valve defining a spool housing in which a control spool is slidably mounted for movement between at least two positions;
(iii) said control spool including means operative in one position to establish fluid communication between a fluid supply line and a fluid accumulating vessel forming part of said brine valve assembly in order to fill said vessel with a predetermined amount of a brine solution fluid, and further operative in another position to establish fluid communication between said vessel and said brine reservoir in order to discharge said fluid accumulated by said vessel into said brine reservoir to mix with said salt to form said brine solution;
(iv) means for shifting said spool between said two positions including means for sensing when said predetermined amount of brine solution fluid has been accumulated in said vessel and when said fluid supply line is above a predetermined pressure.

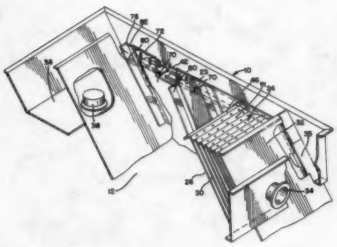
4,889,624

LAMELLA GRAVITY SEPARATOR

Alfonse J. Soriente, Westfield, and Lawrence Gurnari, Morganville, both of N.J., assignors to The Graver Company, Union, N.J.

Filed Jan. 6, 1989, Ser. No. 294,287
Int. Cl.[4] B01D *21/02*
U.S. Cl. 210—232 14 Claims

1. In an apparatus for separation of solids suspended in a liquid, said apparatus including a tank having a lamella plate assembly located within said tank defining a plurality of parallel inclined flow passages therein, an inlet distribution means for directing liquid to be treated into said tank and upwardly through said flow passages, and an outlet trough means extending transversely with respect to said flow passages for receiving clarified liquid from said flow passages; an improved lamella plate assembly, comprising: a plurality of spaced-apart inclined parallel lamella plates defining said flow passages therebetween, said lamella plates having a generally rectangular inclined settling surface and a rear surface; each of said lamella plates having a leg portion extending substantially perpendicular to an upper end portion of said rear surface substantially along the entire width thereof, said leg portion extending between adjacent lamella plates such that the outer edges thereof contact an adjacent settling surface in closing relationship to a corresponding flow passage therebetween; and a plurality of horizontally spaced-apart orifices extending through said lamella plates at an elevation below the elevation of said leg portions said orifices being in communication with



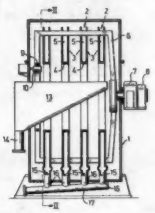
a corresponding flow passage and with an area above said lamella plate assembly in communication with said outlet trough means.

4,889,625

FILTER FOR CONCENTRATING SUSPENSIONS

Harry Nilsson, Nägeliweg 7, CH-8274 Tägerwilen, Switzerland

Filed May 16, 1988, Ser. No. 194,250
Claims priority, application Sweden, May 15, 1987, 8702005
Int. Cl.[4] B01D *33/26*
U.S. Cl. 210—331 9 Claims

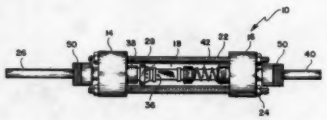


1. A filter for concentrating fiber suspensions, and comprising at least one disc (2) partially submerged in a suspension in a suspension container (1) and rotatable about a substantially horizontal axis, the disc having two mutually spaced filter elements defining a filtrate chamber (5), the filtrate being conveyed through the filter elements to the filtrate chamber (5), and from it to a filtrate outlet (17), while a filter cake (12) is built up on the outside of the filter elements (3), wherein the filtrate chamber (5) communicates with at least a portion of the outer circumference of the disc (2), and along at least a portion of its inner circumference the container (1) is provided under the surface (11) of the suspension with an arcuate duct (15) in communication with the filtrate outlet (17), there being communication between the disc (2) and duct (15) such that the filtrate can be transferred from the filtrate chamber (5) to the duct (15) when said portion of the circumference of the disc (2) passes the duct (15) when the disc rotates.

4,889,626
FILTER CARTRIDGE HAVING A TUNABLE ASYMMETRIC FLUOROPOLYMER ALLOY FILTER MEMBRANE

Ronnie Browne, Derry, N.H., assignor to Memron, Inc., Amherst, N.H.

Filed Nov. 17, 1988, Ser. No. 272,738
Int. Cl.[4] B01D *29/14*
U.S. Cl. 210—359 24 Claims

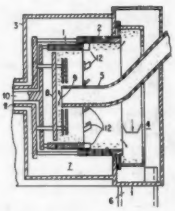


1. A tunable filter cartridge for removing contaminates from a medium, comprising:
an inlet;
an outlet;
a fluoropolymer filter membrane separating the inlet from the outlet and having a first surface confronting the inlet and a second opposite surface confronting the outlet, wherein the filter membrane has a microstructure comprised of nodes joined by fibrils aligned in a direction of orientation sufficient to selectively adjust the size of the pore microstructure, which nodes and fibrils form pores through the filter membrane, wherein the microstructure changes from a relatively large pore microstructure on the first surface to a relatively small pore microstructure on the second surface:
tuning means for physically adjusting the dimension of the filter membrane along the direction of orientation sufficient to selectively adjust the size of the pore microstructure.

4,889,627
PUSHER CENTRIFUGE

Bernd Hoppe, Weinigen, Switzerland, assignor to Sulzer-Escher Wyss Ag, Zürich, Switzerland

Filed Feb. 23, 1989, Ser. No. 314,195
Claims priority, application Switzerland, Mar. 7, 1988, 00834/88
Int. Cl.[4] B01D *33/10*
U.S. Cl. 210—360.2 10 Claims

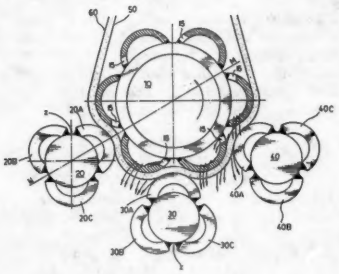


1. A pusher centrifuge, comprising:
a housing;
at least one at least approximately cylindrical sieve drum which is rotatable in said housing and has an inner space and an axis of rotation;
said at least one at least approximately cylindrical sieve drum having two end portions;
means for feeding centrifuging material into said inner space at a first one of said two end portions of said at least one at least approximately cylindrical sieve drum;
said at least one at least approximately cylindrical sieve drum having an inner side and an axial direction;
a solid material outlet provided at a second one of said two end portions of said at least one at least approximately cylindrical sieve drum;
at least one co-rotating pusher ring capable of performing an oscillating motion in said axial direction while transporting at least partially dewatered centrifuging material at said inner side in a direction toward said solid material outlet;
said at least one co-rotating pusher ring having an outer edge portion;
surface elements provided at said outer edge portion of said at least one co-rotating pusher ring;
said surface elements being oriented in inclined relationship to said axis of rotation of said at least one at least approximately cylindrical sieve drum;
said at least one at least approximately cylindrical sieve drum having a predetermined circumferential direction; and
said surface elements imparting to the centrifuging material during said oscillating motion an additional motive component in said predetermined circumferential direction of said at least one at least approximately cylindrical sieve drum.

4,889,628
BELT-LOADING ROLLER ARRANGEMENT FOR THE HIGH PRESSURE REGION IN BELT-FILTER PRESSES

Hajo Niemzig, Pforzheim, Fed. Rep. of Germany, assignor to Mei Tai Co., Ltd., Taipei, Taiwan

Continuation-in-part of Ser. No. 917,157, Oct. 9, 1986, abandoned. This application Jun. 21, 1988, Ser. No. 209,567
Claims priority, application Fed. Rep. of Germany, Oct. 10, 1985, 8528848[U]
Int. Cl.[4] B01D *33/04*
U.S. Cl. 210—386 22 Claims



1. A belt-loading roller arrangement comprising a primary belt-loading roller, which is embraced over at least part of its circumference by two bands for enclosing a pressing stock wherein a supporting surface of the bands on the primary roller consists of a number of cylinder section surfaces, the diameters of which are smaller than the maximum diameter of the primary roller, whereby the tension of the two bands will be increased as they pass around a portion of the periphery of the primary roller to thereby subject the pressing stock to a comparatively steeper rate of increase in pressure than derivable from a cylindrical pressing surface having said maximum diameter; further wherein at least one additional belt-loading roller, which comprises a plurality of cylinder section surfaces, is peripherally arranged such that the crowns thereof act on evacuation regions between the cylinder section surfaces of the primary roller to thereby subject the pressing stock to an additional increase in pressure; at least one said additional

belt-loading roller being peripherally arranged such that the evacuation regions thereof are acted on by the crowns of the cylinder section surfaces of the primary roller; said at least one additional belt-loading roller being held for rotation about a radially immovable axis such that the roller is not pressed against the primary roller.

4,889,629

FILTER PANEL WITH PARALLEL PASSAGES AND MECHANICAL FILTER SCREEN COMPRISING SAME

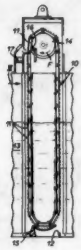
Philip Jackson, Paris, France, assignor to E. Beaudrey & Cie, Paris, France

Filed Jan. 13, 1988, Ser. No. 143,528

Claims priority, application France, Jan. 16, 1987, 8700429

Int. Cl.[4] B01D *25/08, 33/02*

U.S. Cl. 210—401 **13 Claims**



1. A filter panel comprising a plurality of openings and a substantially rigid, generally coplanar array of parallel passages, each of said passages delimiting a respective one of said openings, said passages being elongate and having a substantial dimension perpendicular to the general plane of said array, each of said passages having an inlet and an outlet, the passages having a wall thickness at the inlet and outlet substantially smaller than an average width of the openings, the passages delimiting said openings having a convergent interior profile from their inlet towards their outlet and a convergent interior profile from their outlet towards their inlet.

4,889,630

FILTER BODY

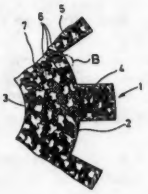
Alexander-Maria Reinhardt, Stimpfach, and Erich K. Reinhardt, Bietigheim-Bissingen, both of Fed. Rep. of Germany, assignors to Schumacher'sche Fabrik GmbH & Co. KG, Crailsheim, Fed. Rep. of Germany

Filed May 20, 1987, Ser. No. 52,848

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1985, 3533924

Int. Cl.[4] B01D *39/14*

U.S. Cl. 210—490 **18 Claims**



1. In a filter body with a self-supporting, open-pored composite body including a support body of coarse porosity consisting of extraneously or intrinsically bonded coarse grain in a binder and a diaphragm of fine porosity containing extraneously or intrinsically bonded fine grain in a binder which is bonded to an external surface of the support body, wherein the improvement comprises said diaphragm containing, in addition to the fine grain and a binder, fibers which have an absolute diameter of between 0.3 and 30 microns and a length at least ten times greater than their diameter and which are at least 10 microns long,

the ratio of the fine grain, the fibers and the binder in percent by volume being (60 to 40):(40 to 20):(30 to 10),

the ratio of the thickness of the support body to the thickness of the diaphragm being between 5:1 and 75:1,

the absolute thickness of the diaphragm being between 0.2 and 2 millimeters, and

the ratio of the specific permeabilities of the support body and the diaphragm for fluids in the laminar flow range being between 2:1 and 100:1.

4,889,631

ANODIC ALUMINIUM OXIDE MEMBRANES

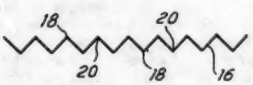
William R. Rigby; Robin C. Furneaux, and Anthony T. Thomas, all of Banbury, England, assignors to Alcan International Limited, Montreal, Canada

Filed Apr. 16, 1987, Ser. No. 39,477

Claims priority, application United Kingdom, Apr. 16, 1986, 8609250

Int. Cl.[4] B01D *25/00*

U.S. Cl. 210—493.1 **9 Claims**



1. A porous anodic aluminium oxide membrane both surfaces of which are profiled on a scale of 0.1 to 10 mm.

4,889,632

MACROPOROUS POLYMERIC MEMBRANES FOR THE SEPARATION OF POLYMERS AND A METHOD OF THEIR APPLICATION

Frantisek Svec, Hrebec; Miroslav Bleha, Prague, both of Czechoslovakia; Tatiana B. Tennikova, and Boris G. Belenkii, both of Leningrad, U.S.S.R., assignors to Ceskoslovenska Akademie ved, Prague, Czechoslovakia

Filed Dec. 7, 1988, Ser. No. 281,266

Claims priority, application Czechoslovakia, Dec. 10, 1987, 9034-87; Oct. 21, 1988, 6987-88

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—500.28 **6 Claims**

1. A macroporous polymeric membrane, comprising: properties for large scale separation of polymers, wherein the said membrane includes a copolymer of a monovinyl monomer, selected from the group consisting of acrylates, methacrylates, vinylpyridine, N-vinylpyrrolidone, vinyl acetate, and hydroxystyrene, and a dinvinyl monomer selected from the group consisting of alkylene and hydroxyalkylene diacrylates and dimethacrylates, divinylbenzene, and divinylpyridine, wherein the weight ratio of the respective types of monomers ranges from 5:95 to 95:5, and said membrane is formed of

polymeric globules having a size from about 0.05 micron to about 0.5 micron, said globules being interconnected by covalent bonds to form communicating voids or pores between the globules.

4,889,633

PROCESS FOR TREATING AQUEOUS FLUIDS CONTAINING ORGANIC COMPOUNDS AND SALTS OF POLYVALENT INORGANIC ACIDS

Heinz Pfenninger, Lupsingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Aug. 3, 1988, Ser. No. 227,879

Claims priority, application United Kingdom, Aug. 5, 1987, 8718495

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—639 **15 Claims**

1. A process for concentrating an aqueous medium containing organic compounds and salts of polyvalent inorganic acids which comprises adjusting the pH value of said medium in the range of below about 4, and subjecting it to a membrane treatment to separate it into an aqueous retentate concentrated with respect to the organic compound, and an aqueous permeate containing inorganic acids and/or salts and being substantially free of organic compounds.

4,889,634

DIALYSATE SOLUTION CONTAINING HYDROXYPROPYL-BETA-CYCLODEXTRIN AND METHOD OF USING SAME

Ragab El-Rashidy, Deerfield, Ill., assignor to Gynex, Inc., Deerfield, Ill.

Filed Oct. 4, 1988, Ser. No. 253,260

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—646 **7 Claims**

4. A substantially glucose-free dialysate composition suitable for peritoneal dialysis and comprising an aqueous dialysis solution containing hydroxypropyl-beta-cyclodextrin having a degree of substitution in the range of about 5 to about 7 and present in a concentration of about 5 to about 35 g/dl.

4,889,635

METHOD AND APPARATUS FOR CONTROLLING THE QUANTITIES OF LIQUID CIRCULATING IN THE DIALYSIS LIQUID CIRCUIT OF AN ARTIFICIAL KIDNEY

Jacques Chevallet, Serezin du Rhone, France, assignor to Hospal Industrie, Cedex, France

Filed Apr. 24, 1987, Ser. No. 42,878

Claims priority, application France, Apr. 25, 1986, 86 06225

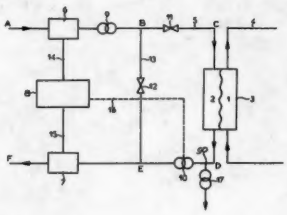
Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—646 **18 Claims**

1. A method for controlling and maintaining the parity of dialysis liquid quantities at the inlet and outlet of a dialysis liquid circuit connected to a haemodialyser, the dialysis liquid circuit having sensing means, positioned upline and downline of the haemodialyser, for measuring the quantity of the circulating dialysis liquid, and at least one means for displacing the dialysis liquid, comprising the steps of:

measuring, with the upline sensing means, the quantity of dialysis liquid flowing at the inlet of the liquid circuit;

measuring, with the downline sensing means and concurrently with measuring the flow in the upline sensing means, the quantity of dialysis liquid flowing at the outlet of the liquid circuit;



generating signals in accordance with the measured flows in the upline and downline sensing means;

comparing the signals representative of the flow through the upline sensing means and the flow through the downline sensing means and generating a signal in accordance with the comparison of the measured quantities of dialysis liquid; and

controlling the operation of said at least one means for displacing the dialysis liquid in response to the signal representative of the comparison of the quantities of dialysis liquid flowing through the upline sensing means and the downline sensing means.

4,889,636

HIGH FLUX RO/UF MEMBRANES

Mordechai Perry, Petach Tikvah; Reuven Kotraro; Charles Linder, both of Rehovot, and Gershon Aviv, Tel Aviv, all of Israel, assignors to Allgena, AG

Continuation of Ser. No. 554,214, Nov. 22, 1983, Pat. No. 4,659,474. This application Jul. 11, 1986, Ser. No. 868,747

Claims priority, application Switzerland, Nov. 23, 1982, 6828 82

The portion of the term of this patent subsequent to Apr. 21, 2004, has been disclaimed.

Int. Cl.[4] B01D *13/00*

U.S. Cl. 210—651 **32 Claims**

1. A dynamically formed, bifurcated membrane for reverse osmosis or ultrafiltration comprising a thin, hydrophilic, crosslinked, polymeric film deposited on under pressure and chemically bonded to a porous, polymeric support, wherein the thin, hydrophilic film is crosslinked by polyfunctional low molecular weight compounds, and the porous polymeric support is optionally crosslinked.

7. A process for reverse osmosis or ultrafiltration of aqueous liquids comprising the steps of:

(a) disposing on one side of a membrane as in claim 1 a solution bearing a solute, and

(b) filtering that solution through said membrane by applying a hydraulic pressure to the solution and the membrane greater than the osmotic pressure of the solution.

4,889,637

SCALE CONTROL WITH TERPOLYMERS CONTAINING VINYL ALCOHOL

Zahid Amjad, 32611 Redwood Blvd., Avon Lake, Ohio 44012, and William F. Masler, 1026 Mattingly Rd., Hinckley, Ohio 44233

Continuation-in-part of Ser. No. 939,333, Dec. 8, 1986, abandoned. This application Aug. 23, 1988, Ser. No. 235,269

Int. Cl.[4] C02F 5/12

U.S. Cl. 210—701 7 Claims

1. A method for inhibiting precipitation of scale, including calcium phosphate, in an aqueous medium, in the presence or in the absence of iron, comprising adding to said aqueous medium an effective amount of a water-soluble copolymer for the purpose of inhibiting precipitation of said scale, said copolymer consisting essentially of (a) 40 to 70% by weight carboxylic monomer selected from acrylic acid, methacrylic acid, salts of such acids, and mixtures thereof, (b) 10 to 50% by weight of a sulfonic monomer selected from 2-acrylamido-2-methylpropane sulfonic acid, 2-methacrylamido-2-methylpropane sulfonic acid, salts of said acids, and mixtures thereof, (c) 5 to 25% of vinyl alcohol, and (d) up to 20% by weight of one or more secondary copolymerizable monomers which do not deleteriously affect performance of said copolymer as anticalant, said polymerizable monomers exclude substituted acrylamides, methyl esters, and vinyl acetate; said copolymer has weight average molecular weight in the range of about 1,000 to 100,000.

4,889,638

AGITATION AND/OR GAS SEPARATION AND DISPERSED GAS FLOTATION

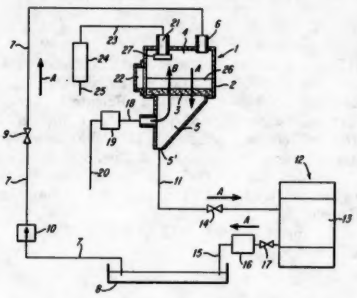
David B. Rockford, Ellon; William H. Sutton; Christopher R. Bond, both of Aberdeen, and Wilkinson, Brian, Methlick, all of Scotland, assignors to Britoil PLC, Glasgow, Scotland

Continuation of Ser. No. 875,162, Jun. 17, 1986, abandoned. This application Aug. 12, 1988, Ser. No. 232,565

Claims priority, application United Kingdom, Jun. 19, 1985, 8515454

Int. Cl.[4] B01D 17/035

U.S. Cl. 210—703 16 Claims



1. A method for the gas flotation treatment of a produced water mixture including oil and water to reduce the oil content of the water, the mixture being continuously produced under a relatively high pressure and having a gas naturally present in solution, said method comprising the steps of:

carrying the mixture from a first vessel at said relatively high pressure in first pipe means to a flotation vessel at a relatively low pressure by way of first controllable pressure letdown means arranged in the first pipe means;

selectively operating the first controllable pressure letdown means to transfer mixture from said first vessel to said flotation vessel according to a rate of production of said mixture;

providing second pipe means having second controllable pressure letdown means, said second pipe means extending from an influent location upstream of the first controllable pressure letdown means to a discharge location in communication with the flotation vessel; and

selectively operating said second controllable pressure letdown means to establish at said discharge location a flow of mixture laden with bubbles of said naturally present gas released from solution and caused by cavitation for gas flotation treatment of mixture in the flotation vessel.

4,889,639

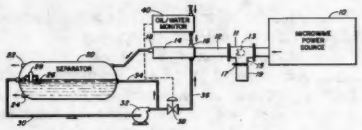
MICROWAVE EMULSION TREATER WITH CONTROLLED FEED WATER CONTENT

Roger L. Hudgins, and Steven E. Hawkins, both of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Filed Jun. 16, 1988, Ser. No. 208,937

Int. Cl.[4] B01D 17/12

U.S. Cl. 210—739 5 Claims



1. In a microwave-based oil-water emulsion treating system comprising a microwave power source, a microwave applicator having inlet and outlet means for a feed stream of material to be treated with microwave energy, a separator for receiving treated material from said applicator, said separator including separate outlet means for removal of an oil phase and an oily water phase separated therein, the improvement comprising:

(a) analyzer means for determining the water content of the feed stream to said applicator;

(b) water supply means for supplying additional water to said applicator; and

(c) control means on said water supply means for controlling the amount of additional water supplied to said applicator, said control means being responsive to a signal from said analyzer indicative of the amount of water in said feed stream to said applicator.

4,889,640

METHOD AND MIXTURE FOR TREATING HAZARDOUS WASTES

Robert R. Stanforth, Madison, Wis., assignor to RMT, Inc., Madison, Wis.

Filed Jun. 10, 1988, Ser. No. 205,458

Int. Cl.[4] C02F 11/14

U.S. Cl. 210—751 9 Claims

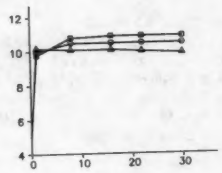
1. A method of treating solid hazardous waste containing unacceptable levels of leachable metals selected from the group consisting of lead and cadmium, the method comprising the step of mixing the solid waste with water treatment lime sludge including at least one agent selected from the group consisting of reactive calcium carbonate, reactive magnesium carbonate and reactive calcium magnesium carbonate, so that under conditions which support reaction between the agent and metals, the metals will be converted to nonleachable forms which are relatively stable under normal environmental conditions.

4,889,641

PROCESS FOR THE NEUTRALIZATION OF A LAYER OF ACIDIC WATER OVER A SEDIMENT COMPRISING A HUMIC SUBSTANCE

Herman Dessart, Brussels, Belgium, assignor to Solvay & Cie, Brussels, Belgium

Filed Nov. 4, 1988, Ser. No. 267,306
Claims priority, application France, Nov. 12, 1987, 87 15760
Int. Cl.[4] C02F 1/68
U.S. Cl. 210—752 11 Claims



11. Process for the neutralization of a layer of acidic water over an acidic, humic sediment, comprising:

providing blocks containing a water soluble sodium compound that are solid at the temperature of the layer of water to be treated and sufficiently dense to sink into the humic sediment, said sodium compound selected from the group consisting of sodium hydroxide and sodium salts derived from acids other than hydracids; and

dropping the blocks into the water layer causing a portion of the sodium compound of the blocks to dissolve in the water layer during the fall of the blocks and neutralize the acidity of the water, and another portion of the sodium compound of the blocks enter the sediment, dissolve in that part of the water which impregnates the sediment, and convert the acidic humic substance into a sodium-containing humic substance which neutralizes the acidity of the water by ion exchange.

4,889,642

METHOD AND FILTRATION APPARATUS FOR PURIFYING SOLVENTS

Klaus Kaiser, Neu-Bamberg, Fed. Rep. of Germany, assignor to Seitz Enzinger Noll Maschinenbau Aktiengesellschaft, Mannheim, Fed. Rep. of Germany

Filed Aug. 4, 1988, Ser. No. 228,953
Claims priority, application Fed. Rep. of Germany, Aug. 4, 1987, 3725761; Jul. 13, 1988, 3823652
Int. Cl.[4] B01D 37/00
U.S. Cl. 210—771 20 Claims

1. In a method of purifying organic solvents via filtration, the improvement in combination therewith comprising the steps of:

providing a filtration apparatus having filter means;

passing said organic solvent through said filter means in a first direction of flow to filter out impurities from said organic solvent, whereby said impurities settle on an upstream side of said filter means, as viewed in said first direction of flow, where the impurities are delivered from said organic solvent to form a filter cake;

passing hot, gaseous medium through any organic solvent residues in said filter means as well as at least said filtered-out impurities, in a second direction of flow that is opposite to said first direction of flow of said organic solvent, for the purpose of vaporizing any organic solvent residues in at least said filtered-out impurities so that organic solvent residues are reclaimed therefrom;

transferring said filter cake to a vaporizer mechanism having a separate chamber means fluidly communicating with said filtration apparatus; and passing said hot, gaseous medium through said impurities of said transferred filter cake.

4,889,643

QUENCH COOLED PARTICULATE FABRIC SOFTENING COMPOSITION

Ralph R. Royce, Milford; Bernard K. Kremer, Cincinnati, both of Ohio, and Paul D. Bisio, Ringwood, N.J., assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed May 5, 1988, Ser. No. 190,728
Int. Cl.[4] C11D 17/00; B29C 39/02; B29D 24/00
U.S. Cl. 252—8.8 12 Claims

1. A particulate, detergent-compatible, dryer-activated, quench cooled fabric softener composition comprising at least about 10% of a cationic fabric softener, the said softener composition having a melting point of from about 40° C. to about 80° C.; wherein the cationic softener is of the formula

$$[R_1R_2R_3R_4N]^+Y^-$$

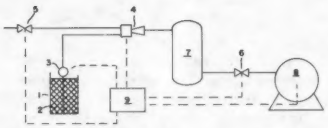
wherein one or two of the R_1, R_2, R_3 and R_4 groups is an organic radical containing a group selected from C_{12}–C_{22} aliphatic radicals, alkyl phenyl radicals having from 10 to 16 carbon atoms in the alkyl chain, and alkylbenzyl radicals having from 10 to 16 carbon atoms in the alkyl chain, the remaining groups being selected from C_1–C_4 alkyl, C_2–C_4 hydroxyalkyl, and cyclic structures in which the nitrogen atom in the formula forms part of a ring, and wherein Y^- is an anionic radical, and wherein the cationic softener comprises from about 10% to about 50% of the softener composition.

4,889,644

MACHINE WASHING PROCESS: DETERGENT PASTE AND AUTOMATIC DISPENSER

Günther Amberg, Neuss; Wolfgang Bechstedt, Langenfeld; Paul Schulz, Wuppertal, and Uwe Trabitzsch, Ratingen, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jun. 15, 1988, Ser. No. 207,610
Claims priority, application Fed. Rep. of Germany, Jun. 15, 1987, 3719906
Int. Cl.[4] D66L 1/12; C11D 17/08
U.S. Cl. 252—8.9 21 Claims



1. A machine washing process with process-controlled dosing of water and detergent, comprising:

a. a paste-form, phosphate-reduced or phosphate-free detergent composition which is substantially free from water, organic solvent selected from the group consisting of low molecular weight, low-boiling alcohols and ether alcohols and hydrotropic compound, comprising a phase which is liquid at a temperature below 10° C. and containing a

nonionic surfactant selected from the group consisting of alkoxylated alcohols and ethoxylated alkylphenols, and a solid phase dispersed therein wherein the particles have a mean particle size of about 5 to about 40 μm and less than about 5% of the particles have a particle size of greater than about 80 μm, the solid phase comprising a washing alkali, sequestering compound and other detergent constituents; and,

b. a process controlled system for dosing said detergent composition into the liquor container of a washing machine, said system removing said detergent composition from a storage container and delivering it to a mixer wherein it is diluted with water to at least such an extent that the formation of a gel phase is avoided, feeding the aqueous detergent mixture to said washing machine, and diluting the aqueous detergent mixture with more water to a concentration of 0.5 to 10 g/l.

4,889,645

SUBSTITUTED-AMMONIUM HUMATE FLUID LOSS CONTROL AGENTS FOR OIL-BASED DRILLING MUDS

William C. Firth, Jr., Robbinsville, N.J., assignor to Union Camp Corporation, Wayne, N.J.

Filed Feb. 8, 1985, Ser. No. 699,845
Int. Cl.[4] C09K 7/02, 7/06
U.S. Cl. 252—8.514 4 Claims

1. In a drilling fluid composition having oil as the continuous phase, the improvement which comprises the presence of a fluid loss-reducing proportion of a quaternary ammonium humate, said humate having been separated from association with titanium mineral deposits, and having a compositional make-up of carbon and hydrogen in a weight to weight ratio of 9.5–17.5:1.0; oxygen in a carbon to oxygen ratio of 1.0–2.3:1.0 (weight to weight); aluminum (2.8–8.4 percent by weight); titanium (0.5 to 3.5 percent by weight); and less than 0.5 percent by weight of calcium, said ammonium group being dimethyldicocoammonium, said quaternary ammonium humate being oil-dispersable.

4,889,646

NITROGEN CONTAINING DISPERSANTS TREATED WITH MINERAL ACIDS

Paula R. Vettel, Downers Grove, Ill., assignor to Amoco Corporation, Chicago, Ill.

Filed Jun. 30, 1987, Ser. No. 68,902
Int. Cl.[4] C10M 133/00, 135/00
U.S. Cl. 252—32.7 E 32 Claims

1. A dispersant composition comprising the reaction product obtained upon reaction of ashless Mannich dispersants, with an inorganic mineral acid selected from the group consisting of sulfuric, nitric and hydrochloric acids at a temperature of from about 200° to about 400° F. and wherein the amount of acid reacted with the dispersant is from about 25% to about 300% of that required to neutralize the dispersant.

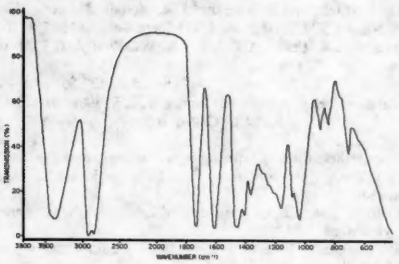
4,889,647

ORGANIC MOLYBDENUM COMPLEXES

Eugene V. Rowan, Rowayton; Thomas J. Karol, Norwalk, and Homer H. Farmer, Westport, all of Conn., assignors to R. T. Vanderbilt Company, Inc., Norwalk, Conn.

Filed Nov. 14, 1985, Ser. No. 797,732
Int. Cl.[4] C10M 133/16
U.S. Cl. 252—42.7 4 Claims

1. An organic molybdenum complex prepared by reacting (a) about 1.0 mole of fatty oil having 12 or more carbon atoms, (b) about 1.0 to 2.5 moles diethanolamine and (c) a molybdenum source sufficient to yield about 0.1 to 6.0 percent of molybdenum based on the weight of the complex, the reaction being carried out at about 70° to 160° C.



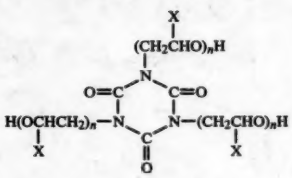
4,889,648

COLD-ROLLING OILS FOR STEEL PLATES

Yuzo Higaki, Tokyo; Hiroyuki Goto, and Keiichi Tanikawa, both of Kanagawa, all of Japan, assignors to The Nisshin Oil Mills, Ltd. and Nippon Steel Corporation, Tokyo, Japan

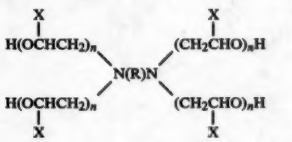
Continuation-in-part of Ser. No. 39,474, Apr. 16, 1987, abandoned. This application Jul. 18, 1988, Ser. No. 220,501
Claims priority, application Japan, Apr. 21, 1986, 61-90098; Aug. 26, 1986, 61-198109; Sep. 18, 1986, 61-218102
Int. Cl.[4] C10M 105/38
U.S. Cl. 252—49.5 3 Claims

1. In a method of cold-rolling steel plates which comprises applying a cold rolling oil to the plates and cold rolling the oiled plates, the improvement which comprises employing as the cold rolling oil an esterified product of (A) a compound selected from the group consisting of those of the formulae



(I)

wherein X is H or CH_3, and n is an integer of 1 to 10; and



(II)

wherein X is H or CH_3, n is an integer of 1 to 10, and R is selected from the group consisting of alkyl having 2 to 6 carbon atoms, a phenyl group or a cyclohexyl group; with (B) a fatty acid having six or more carbon atoms or a mixture of said fatty acid with a rosin compound selected from the group consisting of rosin, disproportionated rosin, hydrogenated rosin and polymerized rosin, thereby imparting a rolling lubricating property and mill cleanability to the surface of steel plates.

4,889,649

METHOD FOR TRANSMITTING POWER

Yoshikazu Murai, Yokohama; Tatsuo Yamaguchi, Tokyo, and Kanji Mochizuki, Yokohama, all of Japan, assignors to Nippon Petrochemicals Company, Ltd., Tokyo, Japan

PCT No. PCT/JP87/00356, § 371 Date Feb. 4, 1988, § 102(e) Date Feb. 4, 1988, PCT Pub. No. WO87/07633, PCT Pub. Date Dec. 17, 1987

PCT Filed Jun. 5, 1987, Ser. No. 157,505

Claims priority, application Japan, Jun. 5, 1986, 61-130919

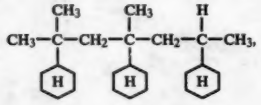
Int. Cl.[4] C10M *105/04*

U.S. Cl. 252—73 **5 Claims**

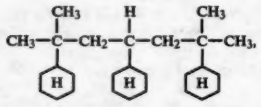
1. A method for transmitting power comprising the use of a traction drive fluid containing, as a base stock, a composition comprising:

(1) 40 weight % to 80 weight % of 2,4-dicyclohexyl-2-methylpentane; and

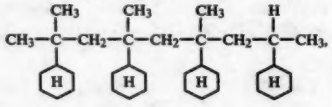
(2) 20 weight % to 60 weight % of a compound selected from the group consisting of



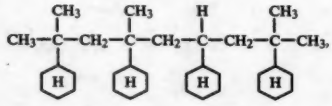
(I)A



(I)B

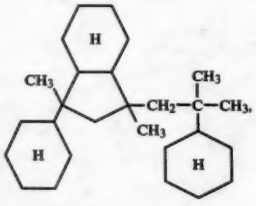


(II)A

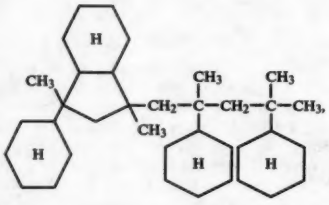


(II)B

said composition also including compounds selected from the group consisting of



(III)



(IV)

and mixtures thereof with the proviso that the total weight of said compounds having the structural formulae III and IV is no more than 50% of the total weight of said compounds represented by formulae IA, IB, IIA and IIB; said composition having a viscosity at 100° C., of 5.0 to 15.0 cSt, thereby transmitting power by the shearing stress caused by an oil film of said composition formed between rotating bodies rotated in a relative relationship.

4,889,650

SYNTHETIC TRACTION FLUID

Narihiko Yoshimura; Hirotaka Tomizawa, and Yasuji Komatsu, all of Saitama, Japan, assignors to Toa Nenryo Kogyo, K.K., Tokyo, Japan

Filed May 28, 1987, Ser. No. 55,239

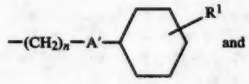
Claims priority, application Japan, Jun. 2, 1986, 61-127641

Int. Cl.[4] C09K *5/00*

U.S. Cl. 252—79 **8 Claims**

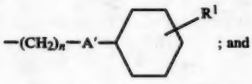
1. A synthetic traction fluid comprising a major amount of at least one ester selected from monoesters, diesters, and triesters, said ester being represented by the formula

wherein Y is independently selected from



and

—$(CH_2)_n$—OH wherein A′ is an ester linkage of —COO— or —OOC—, n is an integer of 1 to 3, and R_1 is independently selected from hydrogen and C_1 to C_8 alkyl groups, with the proviso that at least one Y is



; and

minor amount of at least one material selected from the group consisting of antioxidants, wear inhibitors, corrosion inhibitors and viscosity index improvers.

4,889,651

ACETYLATED SUGAR ETHERS AS BLEACH ACTIVATORS AND DETERGENCY BOOSTERS

Guy Broze, Grace-Hollogne, Belgium, assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Jan. 21, 1988, Ser. No. 146,470

Int. Cl.[4] C11D *3/22, 3/395*

U.S. Cl. 252—95 **13 Claims**

1. A heavy duty laundry detergent composition comprising

a detersively effective amount of a nonionic surfactant,

a bleaching effective amount of a bleaching agent and,

as a bleach activator and detergency booster, a bleach activating and a detergency boosting effective amount of an acetylated sugar ether containing a long chain alkyl group containing at least 10 carbon atoms.

4,889,652

NON-AQUEOUS, NONIONIC HEAVY DUTY LAUNDRY DETERGENT WITH IMPROVED STABILITY USING MICROSPERES AND/OR VICINAL-HYDROXY COMPOUNDS

James J. Sullivan, New Brunswick, and Nagaraj S. Dixit, Kendall Park, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

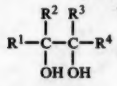
Filed May 2, 1988, Ser. No. 188,886
Int. Cl.[4] C11D 7/54
U.S. Cl. 252—99 32 Claims

1. A non-aqueous liquid fabric treating composition comprising:

a continuous, non-aqueous liquid phase comprising a detersively effective amount of at least one nonionic surfactant;

a suspended particle phase, suspended in said non-aqueous liquid phase, comprising a detergent building effective amount of at least one particulate detergent builder salt; and

a stabilizer in an amount of about 0.05% to about 1.0% by weight of the composition to inhibit phase separtation of said composition, said staiblizer comprising a compound having the formula



wherein R^1, R^2, R^3 and R^4, independently, represent H, lower alkyl of up to 6 carbon atoms, hydroxy-substituted lower alkyl of up to 6 carbon atoms, or aryl, and R^1 and R^4, together with the carbon atoms to which they are attached, may form a 5- or 6-membered carbocyclic ring, with the proviso that no more than two of R^1, R^2, R^3 and R^4 may be aryl.

4,889,653

THIXOTROPIC AQUEOUS LIQUID AUTOMATIC DISHWASHING DETERGENT COMPOSITION CONTAINING ANTI-SPOTTING AND ANTI-FILMING AGENTS

Fahim U. Ahmed, Dayton, and Charles E. Buck, Caldwell, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 113,562, Oct. 28, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 323,136
Int. Cl.[4] C11D 3/08, 3/14, 3/395
U.S. Cl. 252—99 22 Claims

1. An anti-filming and anti-spotting gel-like thixotropic aqueous liquid automatic dishwashing detergent composition comprising water, at least one ingredient selected from the group consisting of organic detergent, bleach, detergent builder, sequestering agent, foam inhibitors, and mixtures thereof, a nonabrasive amount of from about 0.5 to 5% of a silica anti-filming agent having a particle size of about 0.1 to 10 microns and about 2 to 14% of a polyacrylic acid polymer or salt anti-spotting agent, and a sufficient amount of a thixotropic thickener to provide a thixotropic index of about 2.5 to 10.

4,889,654

AQUEOUS FOAM DISINFECTANT CONTAINING CHLORINE DIXOIDE AND PREPARATION AND USE THEREOF

John Y. Mason, Plymouth; Bruce W. Hicks, Rio Linda, and Donald C. English, Carmichael, all of Calif., assignors to Rio Linda Chemical Company, Inc., Rio Linda, Calif.

Continuation of Ser. No. 636,309, Jul. 31, 1984, abandoned, and Ser. No. 879,907, Jun. 30, 1986, Pat. No. 4,731,193. This application Mar. 10, 1988, Ser. No. 166,474
The portion of the term of this patent subsequent to Mar. 15, 2005, has been disclaimed.
Int. Cl.[4] A61K 33/20; A61L 2/20, 2/22; C11D 3/48
U.S. Cl. 252—100 15 Claims

1. A process for disinfecting a surface comprising preparing a foam having substantial amounts of chlorine dioxide gas entrained therein, wherein upon use of the foam, the chlorine dioxide gas entrained therein is intended for cleaning, disinfecting or deodorizing purposes, the process comprising the steps of providing an aqueous solution including an acid foam concentrate, a foam coupler, a surfactant and an acid, wherein a stable mixture is formed having a pH of approximately 3.7 or lower, combining the stable mixture with an alkaline chlorite in a reaction chamber, thereby internally generating chlorine dioxide gas within the stable mixture at a relatively high conversion rate, pressurizing the stable mixture, and injecting air into the pressurized stable mixture to form a foam, thereby substantially maximizing the production of chlorine dioxide gas entrained within the foam, wherein the foam solution containing about 1 to about 1500 mg/l of chlorine dioxide is substantially stable over an appreciable time period for effective cleaning, disinfecting or deodorizing purposes, and wherein no significant amount of chlorine gas or chlorine dioxide gas is liberated from the foam to the adjacent environment during use of the foam; the disinfecting foam being allowed to remain in contact with said surface for a period of time sufficient to allow cleaning and disinfecting thereof.

12. A process for the preparation of a foam having chlorine dioxide gas entrained therein, wherein the foam is intended for cleaning, disinfecting or deodorizing purposes, the process comprising the steps of providing an aqueous solution having at least one surface active agent therein, entraining chlorine dioxide gas in the aqueous solution, wherein the amount of chlorine dioxide gas entrained in the aqueous solution is about 1 to about 1500 mg/l and constitutes the active ingredient therein, pressurizing the aqueous foam solution containing chlorine dioxide, and adding a pressurized gas to the pressurized foam solution, thereby forming the foam, and wherein upon use of the foam, no significant amount of chlorine gas or chlorine dioxide gas is liberated from the foam to the adjacent environment; wherein the chlorine dioxide is generated within the aqueous solution; wherein the step of generating the chlorine dioxide within the aqueous solution comprises the steps of dissolving a soluble metal chlorite in the aqueous solution, dissolving a soluble metal hypohalite in the aqueous solution, providing a reaction chamber having a cation exchange resin in acid form therein, and simultaneously passing the aqueous solution through the reaction chamber, thereby forming chlorine dioxide within the aqueous solution leaving the chamber.

4,889,655

MIXTURES OF FLUORESCENT WHITENING AGENTS

Heinz Hefti, Reinach; Klaus Artz, Muttenz; Kurt Weber; Kurt Burdeska, both of Basel, all of Switzerland, and Dieter Reinehr, Kandern, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

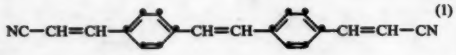
Continuation of Ser. No. 34,519, Apr. 6, 1987, abandoned. This application Dec. 5, 1988, Ser. No. 280,107

Claims priority, application Switzerland, Apr. 18, 1986, 1566/86

Int. Cl.[4] C09K *11/06*

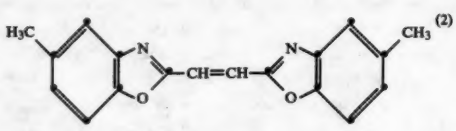
U.S. Cl. 252—301.22 **3 Claims**

1. A mixture of fluorescent whitening agents comprising 20 parts by weight of the compound of formula



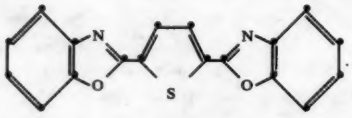
(1)

and 80 parts by weight of a compound of formula



(2)

or



(3)

4,889,656

PERFLUORO(CYCLOALIPHATIC METHYLENEOXYALKYLENE) CARBONYL FLUORIDES AND DERIVATIVES THEREOF

Richard M. Flynn, and Patricia M. Savu, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St Paul, Minn.

Filed Oct. 30, 1987, Ser. No. 116,259

Int. Cl.[4] B01F *17/30*

U.S. Cl. 252—356 **11 Claims**

1. Carboxylate ammonium salt derivatives of perfluoro(cycloaliphatic methyleneoxyalkylene) compositions comprising (1) perfluoro(cycloaliphatic methyleneoxyalkylene) carbonyl fluoride compounds having (a) a perfluorocycloaliphatic moiety which can have up to two perfluoroalkyl substituents and a perfluoroalkylene substituent, and (b) a perfluoromethyleneoxyalkylene carbonyl fluoride radical, the methylene group of said radical being bonded to a ring carbon atom or said perfluoroalkylene substituent of said moiety and said alkylene group of said perfluoromethyleneoxyalkylene carbonyl fluoride being a perfluoro(methyl)methylene group, a perfluoroisopropyleneoxyperfluoro(methyl)methylene group, or a poly(perfluoroisopropyleneoxyperfluoro(methyl)methylene group having up to about 10 perfluoroisopropyleneoxy units.

4,889,657

PARTIAL OXIDATION PROCESS

Frederick C. Jahnke, Rye, N.Y., assignor to Texaco Inc., White Plains, N.Y.

Filed Dec. 22, 1988, Ser. No. 288,213

Int. Cl.[4] C01B *3/36, 3/02*

U.S. Cl. 252—373 **30 Claims**

1. In a process for the partial oxidation of an ash-containing heavy liquid hydrocarbonaceous fuel, an ash-containing solid carbonaceous fuel, or mixtures thereof to produce an effluent gas stream having a temperature in the range of about 2000° F. to 3000° F. and comprising H_2+CO and entrained molten slag and ash; and cooling said effluent gas stream by passing said gas stream in succession through a radiant cooling zone, a metal gas transfer line with internal metal heat transfer surfaces, and a convection cooling zone; the improvement for preventing said molten slag and ash from sticking to the metal heat transfer surfaces on the inside of said gas transfer line comprising: cooling the internal metal heat transfer surfaces of said metal gas transfer line where high gas turbulence occurs to a temperature in the range of about 150° F. to below 700° F. by noncontact heat exchange with a coolant.

4,889,658

PARTIAL OXIDATION PROCESS

Mitri S. Najjar, Hopewell Junction, N.Y., assignor to Texaco Inc., White Plains, N.Y.

Continuation-in-part of Ser. No. 51,982, May 19, 1987, Pat. No. 4,826,627, and a continuation-in-part of Ser. No. 62,018, Jun. 15, 1987, Pat. No. 4,801,438, and a continuation-in-part of Ser. No. 100,673, Sep. 24, 1987, Pat. No. 4,808,386. This application Jun. 20, 1988, Ser. No. 208,929

Int. Cl.[4] C07C *3/36*

U.S. Cl. 252—373 **29 Claims**

1. A process for the production of gaseous mixtures comprising H_2+CO by the partial oxidation of a feedstock comprising a high silicon and sulfur-containing heavy liquid hydrocarbonaceous fuel having a nickel and vanadium-containing ash, or a high-silicon and sulfur-containing petroleum coke or tar sands having a nickel and vanadium-containing ash, or mixtures thereof; and said feedstock includes a minimum of 0.5 wt. % of sulfur and more than about 20,000 parts per million of silicon; and said ash includes a minimum of 5.0 wt. % vanadium, a minimum of 2.0 wt. % of nickel, and a minor amount of Ca and Na; said process comprising:

(1) mixing together said feedstock and an ash fusion temperature modifying agent comprising a silicon-containing material in the amount of about 30 to 90 wt. % and the remainder substantially comprising a manganese-containing material; wherein the weight ratio of said ash fusion temperature modifying agent to ash in the reaction zone in (2) is in the range of about 0.5–7.0 to 1.0, and there is at least 5 parts by weight of ash fusion temperature modifying agent for each part by weight of vanadium;

(2) reacting said mixture from (1) at a temperature in the range of about 2200° F. to 3000° F. and at a pressure in the range of about 2 to 250 atmosphere in a free-flow vertical refractory lined partial oxidation reaction zone with a free-oxygen containing gas in the presence of a temperature moderator and in a reducing atmosphere to produce a hot raw effluent gas stream comprising H_2+CO and entrained molten slag; wherein said refractory lining comprises in weight percent: silicon-containing material in the range of about 95 to 99.8, iron oxide about 0.1 to 1.0, Al_2O_3 about 0.1 to 1.0, CaO about 0 to 0.4, and others about 0 to 1.2; and where simultaneously in said reaction zone separate portions of the said ash fusion temperature modifying agent (i) combine with a portion of said iron, nickel, and sulfur to generate a liquid phase washing agent which washes a portion of the high melting vanadium and oxide phases from the reaction zone, (ii) combine with a portion of said nickel, calcium, silicon, aluminum, magnesium and sodium and/or potassium to generate a liquid oxide-silicate phase that fluxes and washes substantially all of the remaining vanadium and other ash components, and (iii) combine with a portion of the molten ash from the fuel and a minor portion of the refractory lining of said reaction zone to increase the amount of said liquid oxide silicate phase and thereby enhance the removal of the vanadium from said reaction zone; and

(3) separating nongaseous materials from the raw effluent gas stream.

16. A process for the production of gaseous mixtures comprising H_2+CO by the partial oxidation of a feedstock comprising a high silicon and sulfur-containing heavy liquid hydrocarbonaceous fuel having a nickel and vanadium-containing ash, or a high silicon and sulfur-containing petroleum coke or tar sands having a nickel and vanadium-containing ash, or mixtures thereof; and said feedstock includes a minimum of 0.5 wt. % of sulfur and more than about 20,000 parts per million of silicon; and said ash includes a minimum of 5.0 % vanadium, a minimum of 2.0 wt. % of nickel, and a minor amount of Ca and Na; said process comprising:

(1) mixing together a silica-manganese oxide additive with said feedstock; wherein the weight ratio of silica-manganese oxide additive to ash in the reaction zone in (2) is in the range of about 0.5–7.0 to 1.0, and there is at least 5 parts by weight of silica plus manganese oxide for each part by weight of vanadium.

(2) coking said mixture from (1) to produce petroleum coke having a nickel and vanadium-containing ash and having dispersed therein said silica-manganese oxide additive;

(3) introducing the petroleum coke from (2) into the partial oxidation reaction zone in (4) as a pumpable slurry of petroleum coke in water, liquid hydrocarbonaceous fluid or mixtures thereof, or as substantially dry petroleum coke entrained in a gaseous transport medium;

(4) reacting said mixture from (1) at a temperature in the range of about 2200° F. to 3000° F. and at a pressure in the range of about 2 to 250 atmosphere in a free-flow vertical refractory lined partial oxidation reaction zone with a free-oxygen containing gas in the presence of a temperature moderator and in a reducing atmosphere to produce a hot raw effluent gas strem comprising H2 +CO and entrained molten slag; wherein said refractory lining comprises in wt. % silicon-containing material about 95 to 99.8, iron oxide about 0.1 to 1.0, Al_2O_3 about 0.1 to 1.0, CaO about 0 to 0.4, and others about 0 to 1.2, and where in said reaction zone separate portions of the said silica-manganese oxide additive (i) combine with portions of said iron, nickel, and sulfur to generate a liquid phase washing agent, (ii) combine with a portion of said nickel, calcium, silicon, aluminum, magnesium and sodium and-/or potassium to generate a liquid oxide-silicate phase that fluxes substantially all of the remaining vanadium and other ash components; and (iii) combine with a portion of the molten ash from the fuel and a minor portion of the lining of said reaction zone to increase the amount of said liquid oxide silicate phase and thereby enhance the removal of the vanadium from said reaction zone; and

(5) separating nongaseous material from said hot raw effluent gas stream.

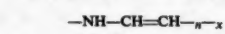
4,889,659

NITROGENIZED ELECTRONIC CONDUCTIVE POLYMERS, THEIR PREPARATION PROCESSES, ELECTROCHROMIC DISPLAY CELL AND ELECTROCHEMICAL GENERATOR USING THESE POLYMERS

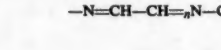
Eugène Genies, St. Egreve, France, assignor to Commissariat a L'Energie Atomique, Paris, France

Filed Sep. 19, 1986, Ser. No. 909,322
Claims priority, application France, Sep. 30, 1985, 85 14451
Int. Cl.[4] H01B *1/06*
U.S. Cl. 252—500 **16 Claims**

1. A nitrogenized electronic conductive polymer, having in the reduced form A the formula:

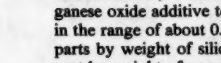


in a first oxidized form B the formula:

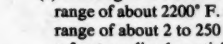


and in a second oxidized form C the formula:

wherein n, x and y are integers such that $1 \leqq n \leqq 20$, and $10 \leqq x \leqq 1{,}000{,}000$ and $5 \leqq y \leqq 500{,}000$, and X^- is an anion selected from the group consisting of Cl^-, HSO_4^-, BF_4^-, SO_3F^-, Br^-, F^-, I^-, ClO_4^-, $H_2PO_4^-$, SO_4^{-2}, PF_6^-, S^{-2}, $(Sp)^{-2}$, wherein $1 \leqq p \leqq 10$, and a perfluorosulfonic acid polyanion; and wherein the hydrogens attached to the polymer carbon atoms are unsubstituted or substituted by halogen; a group selected from the groups consisting of $—CO_2H$, —COCl, —CHO,



—SO_2R, —SR, —OR, —OH, —NO_2, —NH_2, —CF_3, —SO_2, —CN, —SCN and —OCN, wherein R is as defined hereinafter; a straight-chain or branched-chain alkyl group of 1 to about 100 carbon atoms, which alkyl groups are unsubstituted or substituted by the groups: —CO_2H, —COCl, —CHO,



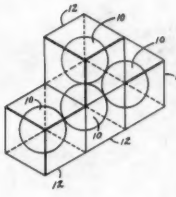
—SO_2R, —SR, —OR, —OH, —NO_2, —NH_2, —CF_3, —SO_2, —CN, —SCN and —OCN, wherein R is an alkyl group of 1 to about 100 carbon atoms; or an aryl radical selected from the group consisting of benzene, naphthalene and anthracene radicals which are unsubstituted or substituted with the same substituents as defined above for the alkyl groups attached to the polymer carbon atoms.

4,889,660

RADIOLUMINESCENT LIGHT SOURCES, TRITIUM CONTAINING POLYMERS, AND METHODS FOR PRODUCING THE SAME

George A. Jensen; David A. Nelson, and Peter M. Molton, all of Richland, Wash., assignors to Battelle Memorial Institute, Richland, Wash.

Filed Dec. 24, 1987, Ser. No. 138,517
Int. Cl.[4] G21G *4/00*; F21K *2/00*; C09K *11/06, 11/08*
U.S. Cl. 252—646 **12 Claims**



1. A radioluminescent light source comprising:

a phosphorescent substance present in an amount from 30 to 80 weight percent of the light source: and

a tritiated solid polymer comprising:

a plurality of interconnected monomers, a significant number of the monomers including a radical bonded with at least one cyclic compound, the cyclic compound having a plurality of hydrogen atoms extending from its cyclic ring, the radicals of adjacent monomers being bonded to one another to interconnect the monomers and form a polymer backbone; and

at least one of said hydrogen atoms extending from a signifi-

cant number of the cyclic rings consisting of tritium, such significant number of cyclic rings being sufficient to produce a radioactive decay of the tritiated solid polymer of at least about 265 Ci/gm of polymer and the light source having a visible luminosity output of at least 2.6 micro-Lamberts per millicurie, the polymer backbone being substantially void of tritium to produce a polymer which is stable and self supporting upon tritium decay.

4,889,661

PROCESS FOR THE PREPARATION OF AROMATIC PHOSPHORUS-CHLORINE COMPOUNDS

Hans-Jerg Kleiner, Kronberg/Taunus, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 23, 1983, Ser. No. 554,591

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1982, 3244031

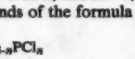
Int. Cl.[4] C07C *5/02*

U.S. Cl. 562—815 **6 Claims**

1. A process for the preparation of phenyl phosphorus-chlorine compounds which comprises reacting phosphine oxides or sulfides of the formula I

(I)

in which X=O or S, and m=1, 2 or 3, with phosphorus-chlorine compounds of the formula II



(II)

in which n=1, 2 or 3, at temperatures between about 330° and 700° C., the resulting phenyl phosphorus-chlorine compounds being mixtures of compounds derived from the formula I compounds by substitution of one or more C_6H_5 groups by chlorine and from the formula II compounds by substitution of one or more chlorine atoms by C_6H_5 groups.

4,889,662

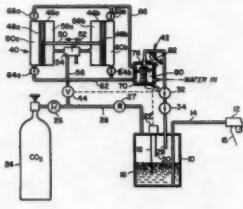
MOTORLESS CARBONATOR

Ira A. Smith, Marietta, Ga., assignor to The Coca-Cola Company, Atlanta, Ga.

Filed Feb. 2, 1989, Ser. No. 305,408

Int. Cl.[4] B01F *3/04*

U.S. Cl. 261—35 **9 Claims**



1. A motorless carbonator comprising:

a closed container for mixing water and gaseous carbon dioxide to form carbonated water which is then accumulated in said container;

means for sensing the level of carbonated water in said container;

means for feeding carbon dioxide from an external source into said container;

a pneumatic water pump driven by carbon dioxide being fed to said container;

a carbon dioxide input control valve coupling carbon dioxide to said water pump and being operable in response to said level sensing means to activate and deactivate said water pump at predetermined sensed levels of carbonated water in said container; and

a spring biased input-output water valve including a water input chamber and a water output chamber separated by a valve member, said water input chamber being coupled between a source of uncarbonated water and said water pump, said water output chamber being coupled between said water pump and said closed container, said water output chamber further including a valve seat therein, a bias spring located in said water input chamber, said valve member being normally biased against said valve seat by said bias spring to interrupt the flow of uncarbonated water to said container when said pump is inoperative but being forced open by water from said pump when operated to feed uncarbonated water into said container.

4,889,663

METHOD OF MANUFACTURING URANIUM OXIDE BASE NUCLEAR FUEL PELLETS

Pirsoul Michel, Turnout, Belgium, assignor to Société Uranium Pechiney, Framatome & Cogema, & Cie, Courbevoie, France

Filed Jun. 10, 1987, Ser. No. 60,292

Claims priority, application France, Jun. 10, 1986, 86 08380

Int. Cl.[4] G21G *4/00*; C01G *43/025*; G21C *21/00*

U.S. Cl. 264—0.5 **6 Claims**

1. A method of manufacturing sintered pellets, comprising the steps of: preparing fine UO_2 powder by dry conversion of UF_6; manufacturing reactive U_3O_8 powder having a grain size less than 350 μm by oxidation in air of part of the UO_2 as obtained by dry conversion, at a temperature less than 800° C.; preparing an intimate mixture of said UO_2 powder and of a proportion of from 5% to 25% by weight of said reactive U_3O_8 powder; cold compressing the mixture into green pellets; and sintering said green pellets.

4,889,664

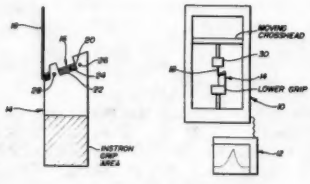
METHOD OF FORMING SHAPED HYDROGEL ARTICLES INCLUDING CONTACT LENSES

Ture Kindt-Larsen, Vedbaek, Denmark; John C. Heaton, and Edmund C. Rastrelli, both of Jacksonville, Fla., assignors to Vistakon, Inc., Jacksonville, Fla.

Filed Nov. 25, 1988, Ser. No. 276,007

Int. Cl.[4] B29D *11/00*

U.S. Cl. 264—2.6 **21 Claims**



11. The process for producing contact lenses which comprises the steps of:

(1) mo[l]ding or casting a polymerization mixture comprising:

(a) a monomer mixture comprising a major proportion of a hydrophilic (meth)acrylate ester, a cross-linking monomer, and a hydrophobic monomer; and

(b) a water-displaceable diluent, wherein said diluent has a viscosity of at least 100 MPa Sec at 30° C., and wherein said diluent consists essentially of a boric acid ester of certain dihydric alcohols, said dihydric alcohols having Hansen polar (δ_p) and Hansen hydrogen bonding (δ_h) cohesion parameters falling within the area of a circle defined as having a center at δ_h=20.5, δ_p=13, and a

radius of 8.5, to produce a shaped gel of a copolymer of said monomers and said diluent, and

(2) thereafter replacing said diluent with water.

4,889,665

PROCESS FOR PRODUCING ULTRAFINE PARTICLES OF CERAMICS

Masahiro Uda, Tokyo; Satoru Ohno, Kiyose, and Hideo Okuyama, Kawasaki, all of Japan, assignors to National Research Institute for Metals, Tokyo, Japan

Division of Ser. No. 616,686, Jun. 4, 1984, Pat. No. 4,642,207. This application Jul. 7, 1986, Ser. No. 882,536

Claims priority, application Japan, Jun. 4, 1983, 58-98786

Int. Cl.[4] B29B *9/00*

U.S. Cl. 264—10 **1 Claim**

1. A process for producing ultrafine particles of ceramics selected from the group consisting of oxides of Ca, Mg, Zr, Cr, Mo and W and carbides of Si, Ti, Hf and W, which comprises

(1) contacting a mass of ceramics selected from the group consisting of oxides of Ca, Mg, Zr, Cr, Mo and W and carbides of Si, Ti, Hf and W with a gas activated by an arc plasma which is generated by application of a voltage across a pair of discharging electrodes at a pressure of about 50 to 760 torr to generate ultrafine particles of said ceramic, wherein said gas is selected from the group consisting of nitrogen, oxygen, and a gaseous mixture of nitrogen and oxygen, and

(2) cooling and collecting said particles.

4,889,666

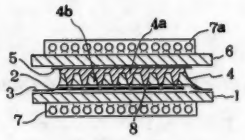
METHOD FOR PRODUCING CONCRETE PRODUCTS PROVIDED WITH INLAID PATTERNS

Masaki Kawasaki, Fukuoka, Japan, assignor to Kabushiki-Kaisha Yamau, Fukuoka, Japan

Filed Sep. 6, 1988, Ser. No. 240,993

Int. Cl.[4] B28B *1/16*; B29C *39/12*; B32B *31/00*

U.S. Cl. 264—22 **2 Claims**



1. A method for producing concrete products provided with inlaid patterns comprising:

(a) preparing a reusable mold provided with recessed patterns by:

(i) providing a layer of an ultra-violet-ray setting resin having at least two opposed surfaces between a pair of ultra-violet-ray emitting lamps;

(ii) emitting ultra-violet rays from said pair of ultra-violet-ray emitting lamps simultaneously on both of said surfaces of said ultra-violet-ray setting resin layer, whereby one of said lamps emits ultra-violet rays on one of said surfaces of said resin layer through means for selectively transmitting said ultra-violet rays onto said one surface in a predetermined pattern to expose pedetermined portions of said one surface to said ultra-violet rays while leaving other portions of said one surface unexposed and whereby the other of said lamps emits ultra-violet rays non-selectively onto the other of said surfaces of said resin layer to expose said other surface in its entirety to said ultra-violet rays, such that those portions of said resin layer exposed to said rays become solidified while those portions of said resin layer not exposed to said rays remain unsolidified; and

(iii) washing out said unsolidified portions from said solidified portions to form said reusable mold having said recessed patterns conforming to said predetermined pattern of said selectively transmitting means;

(b) preparing a waste mold provided with recessed patterns on its surface by casting paraffin in said reusable mold, thereby forming said waste mold of paraffin;

(c) casting concrete into said waste mold and solidifying said concrete to produce a concrete block on said waste mold;

(d) dissolving and removing said waste mold from said concrete block to provide recessed patterns on the surface of said concrete block which was in contact with said recessed patterns on said surface of said waste mold.

(e) filling a coloring material into said recessed patterns on said surface of said concrete block and solidifying said coloring material; and then

(f) grinding said surface of said concrete block to remove excess coloring material from said surface of said block to thereby produce a finished concrete product provided with inlaid patterns on said surface thereof.

4,889,667

METHOD FOR SUPERVISION OF INJECTION MOLDING BY USE OF WAVEFORM OF INTERNAL DIE PRESSURE

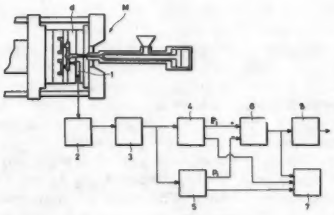
Hisashi Kojima, and Tatsuo Miyagi, both of Tokyo, Japan, assignors to Technoplas Inc., Tokyo, Japan

Continuation of Ser. No. 616,687, Jun. 4, 1984, abandoned. This application May 21, 1987, Ser. No. 53,567

Claims priority, application Japan, Jun. 3, 1983, 58-99243

Int. Cl.[4] B29C *45/77*

U.S. Cl. 264—40.1 **1 Claim**



1. A method for the supervision of injection molding in which an actual internal passageway pressure of molten resin is continuously detected during a process period, said molten resin being injected into a mold through a resin passageway, said method comprising the steps of:

determining an optimum internal passageway pressure, said optimum internal passageway pressure representing a pressure which is expected to be detected during said process period;

dividing said process period into N sampling periods, wherein N is a positive integer;

determining, at each sampling period, a deviation value

between the actual internal passageway pressure and the optimum internal passageway pressure;

further dividing said process period into at least two subprocess periods, wherein the number of subprocess periods is substantially smaller than N;

determining, for each subprocess period, a number of sampling periods in which said deviation value exceeds a predetermined allowable value;

comparing, for each subprocess period, a criterional value with said number of sampling periods in which said deviation value exceeds said predetermined allowable value, said criterional value being independently set in advance for each subprocess period and representing a maximum number of permissible sampling periods in which said deviation value may exceed said predetermined allowable value for each subprocess period; and

providing an alarm indication when the criterional value of any subprocess period is less than the number of sampling periods in which said deviation value exceeds said predetermined allowable value for the subprocess corresponding to the criterional value.

4,889,668

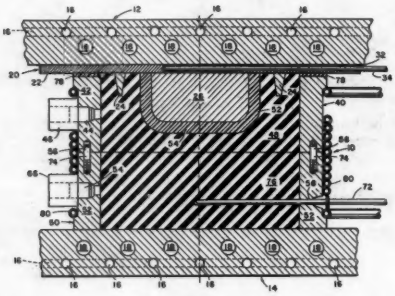
FIXED-VOLUME, TRAPPED RUBBER MOLDING METHOD

Daniel N. Kemp, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 105,108, Oct. 5, 1987, Pat. No. 4,812,115. This application Oct. 17, 1988, Ser. No. 259,059

Int. Cl.[4] B29C *43/10, 43/58*

U.S. Cl. 264—40.5 **24 Claims**



1. A method of subjecting a part to be molded to a predetermined sequence of increased temperatures and pressures, said method comprising the steps of: providing a fixed volume, rigid mold with a die positioned therein, said die having a working surface shaped so as to conform to the configuration of the part to be molded; providing a cured elastomer within said mold which, at least in that area adjacent the die, is an integral solid, said elastomer conforming generally to the interior configuration of said mold and being spaced from said working surface a distance sufficient to accommodate the part to be molded, said elastomer having a relatively high coefficient of thermal expansion and a relatively low coefficient of thermal conductivity, at least the integral solid portion of the elastomer having a relatively low modulus of elasticity; shaping the mold such that said die and the cured elastomer surrounding it define one zone of the interior of said mold with a second zone of the interior of said mold containing additional cured elastomer; laying up the part to be molded on said working surface; closing said mold; molding said part, said molding step including the steps of selectively and independently increasing and decreasing the temperature and pressure to which the part is subjected by selectively heating and cooling said die and at least that portion of the elastomer in said one zone surrounding the die, thereby controlling the temperature to which the part is subjected, and by independently selectively heating and cooling at least a portion of the elastomer in said second zone, thereby controlling the pressure to which the part is subjected independently of its temperature.

4,889,669

PROCESS FOR PRODUCING FOAMED THERMOPLASTIC RESIN ARTICLES

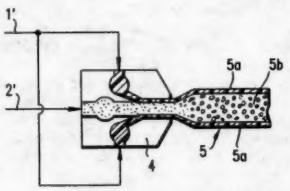
Yasuyosi Suzuki, Mie, Japan, assignor to Mitsubishi Petrochemical Co., Ltd., Tokyo, Japan

Filed Mar. 18, 1988, Ser. No. 169,878

Claims priority, application Japan, Apr. 10, 1987, 62-87003

Int. Cl.[4] B29C *67/22, 47/06*

U.S. Cl. 264—45.9 **13 Claims**



1. A process for producing a foamed thermoplastic resin article which comprises separately melt kneading the first thermoplastic resin composition comprising a first thermoplastic resin and 10 to 400 parts by weight per 100 parts by weight of the first thermoplastic resin of a filler and constituting an unfoamed layer at the time of extrusion molding, and the second thermoplastic resin composition comprising a second thermoplastic resin and a foaming agent and constituting a foamed layer at the time of extrusion molding, by the use of extruders, and coextruding the two resin compositions in the form of laminate through a T die.

4,889,670

PROCESS FOR MANUFACTURING GREEN AND CERAMIC FOAM

Nur R. Gurak; Ronald J. Thompson; James P. Russell, and Joseph M. Yarkovsky, all of Sarnia, Canada, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Mar. 1, 1988, Ser. No. 162,505

Int. Cl.[4] C04B *38/00*

U.S. Cl. 264—50 **21 Claims**

1. A process for manufacturing a green ceramic foam having a thickness of up to 7.5 cm comprising:

(i) mechanically frothing an aqueous ceramic composition comprising from about 5 to 50 parts by dry weight of an aqueous dispersion of a polymeric binder and from 95 to 60 parts by weight of a particulate ceramic material from 1.5 to 10 times its volume;

(ii) forming said froth in to a required shape;

(iii) setting said froth; and

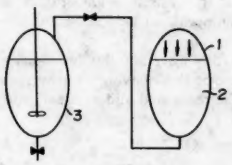
(iv) drying said froth, thereby producing said green ceramic foam.

4,889,671

PRODUCTION METHOD OF PREFOAMED PARTICLES OF POLYOLEFIN RESIN

Hiroyuki Akiyama, Hiratsuka; Susumu Izawa, Utsunomiya; Hideki Kuwabara, Hadano, and Toru Yamaguchi, Utsunomiya, all of Japan, assignors to Japan Styrene Paper Corporation, Tokyo, Japan

Filed May 11, 1988, Ser. No. 192,619
Claims priority, application Japan, May 11, 1987, 62-114026
Int. Cl.[4] C08J 9/22, 9/14, 9/42
U.S. Cl. 264—53 6 Claims



1. A method for producing prefoamed particles of a polyolefin resin by dispersing starting particles of the polyolefin resin, which contains a volatile foaming agent, in a dispersant in a pressure vessel, heating the resultant dispersion to a temperature of at least the softening point of the starting particles in said pressure vessel and then opening the vessel at one end thereof so as to release the starting particles and dispersant into an atmosphere of a pressure lower than the internal pressure of the vessel, which comprises feeding a heating liquid into the vessel while the starting particles and the dispersant are being released, thereby minimizing a change in the partial pressure of the volatile foaming agent.

4,889,672

PROCESS FOR PRODUCING CERAMIC MOLDING

Mitsuo Akutsu, Tokyo, and Keiji Tabata, Urawa, both of Japan, assignors to Adeka Argus Chemical Co., Ltd., Tokyo, Japan

Filed Feb. 2, 1988, Ser. No. 151,608
Claims priority, application Japan, Feb. 10, 1987, 62-28729
Int. Cl.[4] C04B 33/32
U.S. Cl. 264—63 10 Claims

1. A process for the production of a ceramic molding comprising forming a molding composition comprised of an admixture of (1) a ceramic powder and (2) an adduct of an epoxidized polybutadiene with an organic amine having a reactive NH group, said adduct being present in said admixture in an amount in the range of 0.1 to 20 parts by weight to 100 parts by weight of said ceramic powder, and firing said molding composition to produce said ceramic molding.

4,889,673

PROCESS FOR PREPARING POLYVINYL CHLORIDE MATERIAL USED FOR EXTRUSION MOLDING

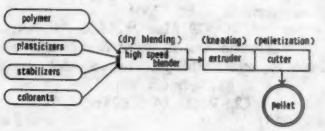
Masahiro Takimoto, Mie, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Dec. 6, 1988, Ser. No. 280,356
Claims priority, application Japan, Jan. 22, 1988, 63-13386
Int. Cl.[4] B29B 7/32, 9/06; B29C 47/00
U.S. Cl. 264—118 2 Claims

1. A process for preparing polyvinyl chloride material used for extrusion molding comprising:

(1) a step of dry blending a blend prepared by blending polyvinyl chloride (polymer) with plasticizers and stabilizers, and optionally with colorants while controlling a temperature for the blend within a range from 20° C. to 165° C., and

(2) a step of kneading and pelletizing the blend after the dry blending step while controlling a temperature for the blend within a range from 120° C. to 165° C., in which the polyvinyl chloride used is a product by suspension polymerization capable of satisfying the condition that the



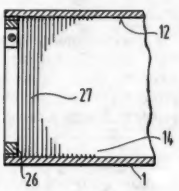
retention ratio on 80 mesh screen (ASTM: E11-58T) is less than 1%.

4,889,674

METHOD FOR THE MANUFACTURE OF DIMENSIONALLY STABLE, LIQUID-IMPERMEABLE, FLEXIBLE PRESS BANDS

Bernhard Krenkel, and Heinz Joos, both of Heidenheim, Fed. Rep. of Germany, assignors to F. Oberdorfer GmbH & Co. KG Industriegewebe-Technik, Fed. Rep. of Germany

Filed Apr. 24, 1987, Ser. No. 42,027
Claims priority, application Fed. Rep. of Germany, Dec. 3, 1986, 3641191
Int. Cl.[4] B29C 41/04, 41/20
U.S. Cl. 264—130 10 Claims



1. A method of manufacturing dimensionally stable, liquid-impermeable, flexible, elastic press bands, for the use in broad-nip wet presses of paper making machines, said press bands being provided on their surfaces with cavities or depressions suited for liquid drainage, comprising fixing a profiled film to the inner wall of a centrifugal tube so that said profiled film extends over substantially the entire inner wall of said tube, said profiled film being provided with cavities or depressions,

rotating said tube and said profiled film,

casting with a casting head a bubble-free, free-flowing mixture of a prepolymer onto an inner surface of the profiled film and curing the mixture, said casting head being movable in a longitudinal direction of said centrifugal tube so that said profiled film is filled with said free-flowing mixture and forms raised surface portions on the outer side of the finished press band which raised surface portions discharge liquid in a later pressing operation, and

then grinding the cast press band while being still inside the centrifugal tube to a finished size on the inner side thereof;

wherein said profiled film becomes an integral part of said press band to thereby form drainage depressions in the outer surface of said press band.

4,889,675

METHOD FOR CUTTING UNHARDENED CONCRETE WITH A SOFT CONCRETE SAW

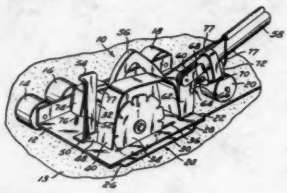
Edward Chiuminatta, and Alan R. Chiuminatta, both of 6677 Columbus, Riverside, Calif. 92504

Division of Ser. No. 843,779, Mar. 25, 1986, Pat. No. 4,769,201. This application Apr. 22, 1988, Ser. No. 185,055

The portion of the term of this patent subsequent to Sep. 6, 2005, has been disclaimed.

Int. Cl.[4] B26D *3/06*; B28B *11/08*

U.S. Cl. 264—154 40 Claims



37. A method of cutting grooves in concrete, comprising the steps of:

finishing an exterior surface of the concrete;

cutting a groove in the surface with a rotating blade having an up-cut rotation and having a cutting edge and sides, the cutting occurring before the concrete has hardened sufficiently to allow cutting by a conventional abrasive concrete saw, while still producing an acceptable surface finish adjacent the cut groove, the cutting step occurring when the concrete has a hardness such that a 1.125 inch diameter steel rod with a flat end, and weighing about 5.75 pounds, would case an indentation in the surface of the concrete of about 1.32 of an inch when the rod is dropped from a height of about 24 inches above the surface of the concrete; and

supporting the surface immediately adjacent the sides of the cutting blade sufficiently close to, and along a sufficient portion of, the cutting blade, to prevent damage to the surface as the groove is cut and to produce an acceptable surface finish adjacent the cut groove.

4,889,676

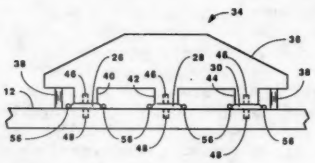
METHOD OF MOLDING A PRECISION SURFACE IN AN INSTRUMENT TABLE

Larry Rosenberg, San Jose; Curt H. Chadwick, Los Gatos, and Alex Brudny, San Jose, all of Calif., assignors to KLA Instruments Corporation, San Jose, Calif.

Filed Feb. 19, 1988, Ser. No. 158,252

Int. Cl.[4] B29C *39/10*

U.S. Cl. 264—255 4 Claims



1. A method of replicating a precision surface on an instrument table, said method comprising the steps of:

a. applying a dollop of a plastic material to a countable number of areas on the surface of said instrument table where the precision surface is to be created, each of said dollops being of sufficient volume to cover the associated portion of the surface when step b. is completed;

b. lowering a jig, having a countable number of regions on the bottom surface thereof each machined or ground to the specifications of the precision surface to be created on said instrument table, onto the instrument table bringing the machined or ground bottom regions thereof into contact with said plastic material and the countable number of areas on the surface of the instrument table where the precision surfaces are to be created;

c. supporting the machined or ground surface of the jig above the surface of the instrument table a distance that is equivalent to the desired height of the plastic material;

d. allowing the plastic to harden against the surface of the jig; and

e. Removing the jig from the instrument table leaving thereon a plastic layer having a top surface that is a replication of the machined and polished bottom surface of said jig.

4,889,677

PROCESS FOR CURING TIRE EMPLOYING A BLADDER LUBRICANT

Takatsugu Hashimoto, Higashiyamato, and Seisuke Tomiya, Tokorozawa, both of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 889,840, Jul. 28, 1986, abandoned. This application Jun. 1, 1988, Ser. No. 200,963

Claims priority, application Japan, Jul. 29, 1985, 60-167330; Feb. 15, 1986, 61-29919

Int. Cl.[4] B28B *7/36*; B29C *35/02, 33/64*

U.S. Cl. 264—297.5 12 Claims

1. A method of molding and vulcanizing an unvulcanized rubber product by using a curing bladder, wherein said curing bladder is treated at the surface thereof with a silicone composition, said method comprising the steps of:

applying said silicone composition to the surface of said curing bladder; placing an unvulcanized rubber product into a mold; conforming said unvulcanized rubber product to an internal surface of said mold by internally pressurizing said curing bladder into contact with a surface of said vulcanized rubber product; applying heat and curing said unvulcanized rubber product to form a vulcanized rubber product having a predetermined shape dictated by said mold; the improvement comprising applying said silicone composition comprising:

(a) 100 parts by weight of a polyorganosiloxane having a viscosity at 25° C. of from 3,000 to 5,000,000 cst, said polyorganosiloxane having organic groups bonded to the silicon atoms of said polyorganosiloxane, said organic groups being selected from the group consisting of methyl, ethyl, propyl, butyl, pentyl, hexyl, octyl, decyl, vinylphenyl, β-phenylethyl, β-phenylpropyl, chloromethyl, chlorophenyl and 3,3,3-trifluoropropyl, and wherein more than 90 mol % of said organic groups are methyl;

(b) from 30 to 300 parts by weight of a polymethylhydrogensiloxane having a viscosity at 25° C. of from 10 to 70 cst;

(c) from 2 to 25 parts by weight of finely powderous silica, and

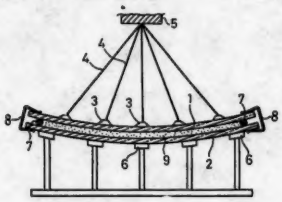
(d) from 0 to 30 parts by weight of an organic acid salt of one or more metals selected from the group consisting of zinc, magnesium, manganese and cobalt, and wherein said polyorganosiloxane (a) and said polymethylhydrogensiloxane (b) make up the silicone component of said silicone composition; and, the improvement further comprising the steps of said method being executed successively for more than 40 of said vulcanized rubber products without reapplication of said silicone composition to said surface of said curing bladder.

4,889,678

CASTING A PLASTIC WINDSHIELD

Keiichi Obata; Suguru Yoshida; Masahiro Saitoh, and Yoshinobu Ono, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 31, 1988, Ser. No. 200,619
Claims priority, application Japan, May 29, 1987, 62-134188; May 29, 1987, 62-82651
Int. Cl.[4] B29C *39/02*
U.S. Cl. 264—313 4 Claims



1. A method of manufacturing a large, thin plastic sheet comprising the steps of:

sandwiching an elongate packing between two large sheet-like mold members in an encircling manner to define a large, thin mold cavity therebetween;

pouring a thermosetting plastic material into said mold cavity;

heating and setting the thermosetting plastic material in said mold cavity;

holding said two mold members each at a plurality of points to prevent deformation in a direction toward each other upon shrinkage of the thermosetting plastic material when the latter is set; and

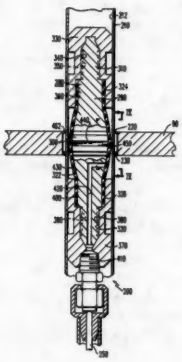
allowing said packing to move transversely inwardly of the mold cavity for following the shrinkage of the thermosetting plastic material when the latter is set.

4,889,679

EDDY CURRENT PROBE APPARATUS HAVING AN EXPANSIBLE SLEEVE

David A. Snyder, North Huntingdon, and Johnny J. Anderson, Hampton Township, Allegheny County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 16, 1988, Ser. No. 156,494
Int. Cl.[4] G21C *17/00*
U.S. Cl. 376—258 14 Claims



8. In a nuclear reactor power plant, an eddy current probe apparatus capable of being disposed in a steam generator tube adjacent to a structure, comprising:

(a) a generally cylindrical support body capable of being disposed in the tube;

(b) a generally cylindrical expansible sleeve surrounding said support body for diametrically expanding the tube into engagement with the structure, said sleeve having a first sleeve end and a second sleeve end capable of being sealingly compressed against said support body;

(c) fluid feed means in fluid communication with said sleeve for pressurizing and depressurizing said sleeve;

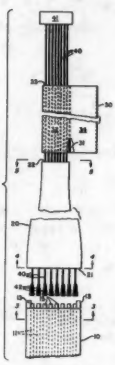
(d) an eddy current coil connected to said support body and interposed between said support body and said sleeve and having a plurality of electricity conducting wires therein surrounding said support body on the in-board side of said sleeve for detecting the variations in the electromagnetic characteristics of the tube and of the structure, whereby the location of the structure relative to said sleeve is electromagnetically detected thereby and whereby the extent of diametrical expansion of the tube is continuously electromagnetically detected by said eddy current coil.

4,889,680

METHOD FOR COMPACTING SPENT NUCLEAR REACTOR FUEL RODS

William J. Wachter, Wexford, Pa., assignor to U.S. Tool & Die, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 291,230, Aug. 10, 1981, Pat. No. 4,775,507. This application Feb. 2, 1988, Ser. No. 151,545
The portion of the term of this patent subsequent to Oct. 14, 2005, has been disclaimed.
Int. Cl.[4] G21C *19/32*
U.S. Cl. 376—261 6 Claims



1. A method for compacting nuclear fuel rods of a fuel rod assembly to allow storage thereof in compacted for in a fuel rod storage canister, said method including the steps of:

positioning a fuel rod directing chamber between said fuel rod assembly and said fuel rod storage canister, said fuel rod directing chamber having a fuel rod entrance end with an array of spaced apart discrete openings to receive the ends of nuclear fuel rods in said fuel rod assembly, the spacing between the discrete openings ever decreasing in a direction from said fuel rod entrance end to a fuel rod discharge end;

moving said nuclear fuel rods in the direction of their lengths from the fuel rod assembly through said fuel rod directing chamber such that the fuel rods are merged into an ever-increasing density wherein spacing between each of the individual ones of the fuel rods continuously reduces in all directions concurrently such that upon reaching the fuel rod discharge end of the fuel rod directing chamber, the

fuel rods are positioned to form a compacted array of fuel rods, characterized in that adjacent ones of the fuel rods are in mutual contact; and

discharging the nuclear fuel rods in said compacted array from the fuel rod directing chamber to said storage canister for storage in said compacted array.

4,889,681

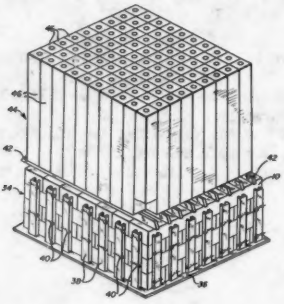
APPARATUS FOR REDUCING FLOOR AND SEISMIC LOADINGS IN UNDERWATER STORAGE AREAS USED IN THE STORING OF SPENT NUCLEAR FUEL RODS

William J. Wachter, Wexford, Pa., and Anton A. Fuierer, Victor, N.Y., assignors to U.S. Tool & Die, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 660,477, Dec. 7, 1984, Pat. No. 4,666,660, which is a continuation of Ser. No. 312,243, Oct. 19, 1981, abandoned. This application Jun. 17, 1986, Ser. No. 875,454

Int. Cl.[4] G21C *19/06, 19/40*

U.S. Cl. 376—272 **21 Claims**



1. A storage system for the storage of nuclear waste material, including:

a plurality of storage canisters having a longitudinal length great enough to hold spent nuclear fuel rods, with said storage canisters being stacked upon one another and side-by-side thereby creating a horizontal and a vertical array of said storage canisters;

a rack structure for maintaining said storage canisters in said horizontal and vertical arrays said rack structure including; a horizontal base of lengthwise dimensions greater than the lengthwise dimensions of said storage canisters for positioning beneath said plurality of storage canisters; and

a series of vertically extending said rails attached around the periphery of said horizontal base for engaging the ends of said storage canisters.

4,889,682

PASSIVE COOLING SYSTEM FOR NUCLEAR REACTOR CONTAINMENT STRUCTURE

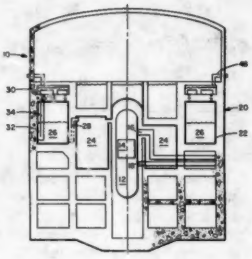
Perng-Fei Gou, and Gentry E. Wade, both of Saratoga, Calif., assignors to General Electric Company, San Jose, Calif.

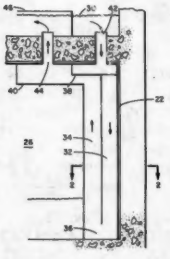
Filed May 20, 1988, Ser. No. 196,581

Int. Cl.[4] G21C *15/18*

U.S. Cl. 376—283 **10 Claims**

1. The passive cooling natural circulation system for the containment structure of a nuclear reactor plant which provides overpressure protection within the containment housing, comprising a nuclear reactor assembly having a pressure vessel with a heat producing core of fissionable fuel enclosed therein and at least one conduit in fluid communication with the interior of the pressure vessel extending out therefrom, a drywell chamber adjacent to said pressure vessel, a suppression pool chamber for retaining a cooling liquid and having a conduit providing fluid communication between said drywell chamber and suppression pool chamber, a compartment providing a liquid refill pool for liquid water isolated from radioactive fission products located overhead of the suppression pool chamber, a multiplicity of conduits arranged in a staggered array extending downward into the suppression pool chamber adjoining a wall thereof, said conduits being joined at their lower extremities with an adjacent conduit through a junction to provide a closed circuit therethrough for the passage of fluid down into the suppression pool chamber from above and return up to above said chamber, said multiplicity of adjacent conduits having such terminal end extending upward from





their lower junction in fluid communication with the refill pool compartment overhead of the suppression pool chamber have one terminal end in fluid communication with the refill pool compartment on one side of a baffle provided therein and the other terminal end in fluid communication with the refill pool compartment on the other side of the baffle whereby liquid contained within the overhead refill pool compartment can circulate down via the conduits through the contents of the suppression pool chamber and return back up to the refill pool compartment thereby removing heat from the containment structures.

4,889,683

THERMALLY RESPONSIVE TRIGGER DEVICES AND THEIR USE IN SHUT-DOWN DEVICES FOR NUCLEAR REACTORS

James Ford, Liverpool, and John Webb, Lancashire, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

Continuation of Ser. No. 459,999, Jan. 21, 1983, abandoned. This application Mar. 24, 1986, Ser. No. 842,854

Claims priority, application United Kingdom, Jan. 28, 1982, 8202435; Jan. 28, 1982, 8202436

Int. Cl.[4] G21C *7/02*

U.S. Cl. 376—336 **4 Claims**

1. In a liquid metal cooled nuclear reactor, a thermally responsive trigger device for releasing a neutron absorbing

element suspended above the reactor core, wherein the improvement comprises,

a. a closed bellows having a fixed end, and a free end which defines an axially extending push member, the bellows being oriented substantially vertically with the fixed end uppermost and located in the reactor so as to be responsive to the temperature of the reactor coolant;

b. liquid metal filling the bellows so as to expand the bellows axially and move said push member axially in response to increasing temperatures;

c. a rotatable plate means below the bellows and having at least one portion thereof for suspending a neutron absorber element therefrom, and

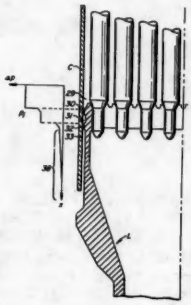
d. cooperating interengaging cam means carried in part by the push member and in part by the plate means, the cam means being constructed and arranged such that downward movement of the push member as a result of axial expansion of the bellows in response to temperature rise of the coolant causes rotary movement of the plate means thereby to release the neutron absorber element.

4,889,684

HYDRAULIC REINFORCEMENT OF CHANNEL AT LOWER TIE-PLATE IN BWR FUEL BUNDLE

Eric B. Johansson, San Jose, Calif., assignor to General Electric Company, San Jose, Calif.

Filed Aug. 1, 1988, Ser. No. 226,482
Int. Cl.[4] G21C *3/32*
U.S. Cl. 376—444 8 Claims



1. In a fuel bundle for confining fuel rods for the generation of steam in a steam water mixture passing interior of the fuel bundle and wherein said fuel bundle includes; a lower tie-plate for supporting said fuel rods and permitting flow from the lower exterior portion of said fuel bundle into the interior portion of said fuel bundle;

a plurality of fuel rods, said fuel rods supported on said lower tie-plate extending upwardly to and towards the upper portion of said fuel bundle for the generation of steam in a passing steam and water mixture interior of said fuel bundle;

an upper tie-plate for maintaining said fuel rods in side-by-side relation and permitting a threaded connection between a plurality of said fuel rods with said threaded connection being at said upper and lower tie-plate, said upper tie-plate permitting escape of a steam water mixture from the top of said fuel bundle;

a fuel bundle channel extending from a position surrounding said upper tie-plate to a position surrounding said lower tie-plate, the improvement to said lower tie-plate comprising;

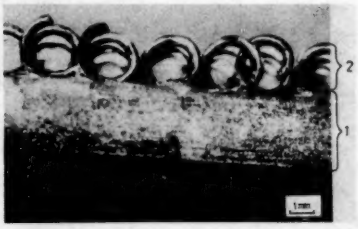
a labyrinth seal configured in said lower tie-plate, said labyrinth seal configured in the interstitial volume between the upper portion of said lower tie-plate adjacent the interior of said channel and said channel at the point of overlap to said lower tie-plate for providing rapid pressure decline, whereby the lower portion of said channel is not loaded by pressure and reinforces the overlying stressed portion of said channel.

4,889,685

PROCESS OF PRODUCING TITANIUM COMPOSITE HAVING A COIL-SHAPED SKELETAL STRUCTURE ON THE SURFACE THEREOF

Takayuki Shimamune, Tokyo, and Masashi Hosonuma, Kanagawa, both of Japan, assignors to Permelec Electrode Ltd., Kanagawa, Japan

Filed Nov. 28, 1986, Ser. No. 935,986
Claims priority, application Japan, Nov. 27, 1985, 60-264986
Int. Cl.[4] B22F *7/00*
U.S. Cl. 419—9 3 Claims



1. A process for producing a titanium composite having a coil-shaped skeletal structure on a surface of a titanium or titanium alloy substrate, which comprises:

providing a coating composition which is a mixture of a titanium or titanium alloy powder with a binder;

providing titanium or titanium alloy coils on the surface of a titanium or titanium alloy substrate;

applying said coating composition in such a manner that said titanium or titanium alloy coils which are to form the coilshaped skeletal structure are securely attached to both themselves and to the titanium or titanium alloy substrate; then

heating the assembly either in vacuo or in an inert atmosphere so that the titanium or titanium alloy powder in the applied coating composition is sintered to have the coil-shaped skeletal titanium or titanium alloy structure attached firmly onto the titanium or titanium alloy substrate.

4,889,686

COMPOSITE CONTAINING COATED FIBROUS MATERIAL

Raj N. Singh, Schenectady, and Achuta R. Gaddipati, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Feb. 17, 1989, Ser. No. 311,801
Int. Cl.[4] B22F *3/26*
U.S. Cl. 419—13 28 Claims

1. A process for producing a composite containing at least about 10% by volume of boron nitride coated fibrous material and having a porosity of less than about 20% by volume which comprises:

(a) forming a slurry of infiltration-promoting material and organic binding material in a liquid medium;
(b) depositing a coating of boron nitride on fibrous material leaving no significant portion thereof exposed;
(c) depositing a silicon-wettable coating on said boron nitride-coated fibrous material leaving no significant portion of said boron nitride exposed;
(d) providing the resulting coated fibrous material substantially as a layer;
(e) casting said slurry onto said coated fibrous material in an amount sufficient to form a tape therewith;
(f) evaporating said liquid medium forming a tape;
(g) firing said tape to remove said organic binding material producing a porous body;
(h) providing an infiltrant comprised of boron and silicon containing elemental boron in solution in silicon in an amount of at least about 0.1% by weight of elemental silicon;
(i) contacting said porous body with infiltrant associated infiltrating means whereby said infiltrant is infiltrated into said porous body;
(j) heating the resulting assembly in a partial vacuum to a temperature at which said infiltrant is molten and infiltrating said molten infiltrant into said porous body to produce an infiltrated product; and
(k) cooling said product producing said composite.

4,889,687

NODULAR CAST IRON HAVING A HIGH IMPACT STRENGTH AND PROCESS OF TREATING THE SAME

Yasuoki Ishihara; Fumio Obato, both of Fukuoka; Jun Sakai, and Takeshi Natsume, both of Saitama, all of Japan, assignors to Hitachi Metals, Ltd. and Honda Giken Kogyo K.K., both of, Japan

Filed Mar. 9, 1988, Ser. No. 165,873
Claims priority, application Japan, Mar. 9, 1987, 62-052205; Mar. 9, 1987, 62-052206; Dec. 23, 1987, 62-323812; Dec. 23, 1987, 62-323813
Int. Cl.[4] C22C 37/04
U.S. Cl. 420—13 16 Claims

1. Nodular cast iron consisting essentially of:
3.0 to 4.0 weight % of carbon;
1.5 to 2.3 weight % of silicon;
less than 0.3 weight % of manganese;
less than 0.03 weight % of phosphorus;
less than 0.10 weight % of chromium;
0.02 to 0.06 weight % of magnesium; and
0.0015 to 0.0150 weight % of bismuth;
the balance consisting of iron and inevitable impurities and the CE (carbon equivalent) value being from 3.9 to 4.6%.

4,889,688

PROCESS OF PRODUCING NODULAR CAST IRON

Makoto Suenaga; Fumio Obata, both of Fukuoka; Jun Sakai, and Takeshi Natsume, both of Saitama, all of Japan, assignors to Honda Giken Kogyo K.K. and Hitachi Metals, Ltd., both of, Japan

Filed Nov. 18, 1988, Ser. No. 273,798
Claims priority, application Japan, Nov. 20, 1987, 62-293816
Int. Cl.[4] C22C 33/08
U.S. Cl. 420—22 13 Claims

1. A process of producing nodular cast iron, comprising the steps of:
placing a spheroidization agent and a graphitization promoting agent into a ladle;
adding a graphite atomization agent to a molten metal having a composition to form nodular cast iron;
performing a spheroidization process by charging said molten metal into the ladle; and
pouring said molten metal from said ladle into a mold.

4,889,689

METHOD OF DISINFECTING A SOFT CONTACT LENS WITH A DIETHYLENE TRIAMINE PENTA(METHYLENEPHOSPHONIC ACID) STABILIZED HYDROGEN PEROXIDE SOLUTION

Fupao Tsao, Lawrenceville, Ga., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 9[illegible],947, Oct. 14, 1986, abandoned.
This application Oct. 31, 1988, Ser. No. 264,597
Int. Cl.[4] A61L 9/00; A61K 33/40
U.S. Cl. 422—30 10 Claims

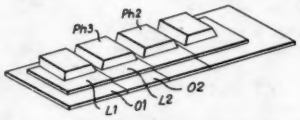
1. A method of disinfecting a soft contact lens comprising contacting said lens with a stabilized aqueous hydrogen peroxide solution having a pH between about 5.5 and about 7.5, a hydrogen peroxide content of between about 0.5 and about 6% by weight, and containing between about 0.003 and about 0.03% by weight of diethylene triamine penta(methylenephosphonic acid) or a physiologically compatable salt thereof, as a stabilizer, such that the solution, upon decomposition of the hydrogen peroxide, is physiologically tolerable to the ocular environment.

4,889,690

SENSOR FOR MEASURING PHYSICAL PARAMETERS OF CONCENTRATION OF PARTICLES

Norbert Opitz, Schwerte, and Dietrich W. Lübbers, Dortmund, both of Fed. Rep. of Germany, assignors to Max Planck Gesellschaft, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 614,728, May 25, 1984, abandoned.
This application May 7, 1987, Ser. No. 51,252
Claims priority, application Fed. Rep. of Germany, May 28, 1983, 3319526
Int. Cl.[4] G01N 21/49; G02B 6/10
U.S. Cl. 422—73 25 Claims



1. A physical sensor for measuring physical parameters inclusive of concentration of particles, comprising a laminar formation assembled of a laminar source of a luminescent first radiation, an indicator layer adjoining a major side of said laminar source and being permeable to particles of measurement, said indicator layer containing molecules emitting a fluorescent second radiation when illuminated by said first radiation, fluorescence quenching of the second radiation

depending on concentration of said particles of measurement dispersed in said indicator layer; and a photoelectric receiver optically coupled to said indicator layer to receive and measure said second radiation while rejecting said first radiation.

4,889,691

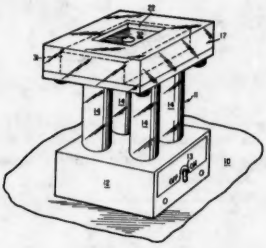
MODULAR TISSUE SUPERFUSION CHAMBER

Thomas M. Argentieri, 1008 Darby Dr., Yardley, Pa. 19067, assignor to Thomas Michael Argentieri, Yardley, Pa.

Filed Jul. 5, 1988, Ser. No. 215,976

Int. Cl.[4] B01L *3/00*; C12M *1/34*

U.S. Cl. 422—102 **15 Claims**



1. A modular tissue superfusion chamber comprising:

a magnetic base for supporting the chamber on a steel surface;

support means;

a support chamber rigidly secured to the support means, the support chamber having a single recess therein of a preselected size and geometry;

temperature control means disposed in the support chamber and aligned with the recess for precisely controlling heat passing through the recess; and

a plurality of modular bath containers for interchangeable mounting in the single recess, each having an identical external size and configuration matching that of the recess in the support chamber and each having a space therein of a different size and/or geometry for containing a bath and receiving tissue samples of different sizes and configurations, each modular container having ports therethrough for receiving at least one tube and at least one electrode, which electrode monitors electrophysiological characteristics of the tissue sample immersed in the bath.

4,889,692

DISPOSABLE SAMPLE PREPARATION CONTAINER

Marc E. Holtzman, 331 Trailside Way, Ashland, Mass. 01721

Continuation of Ser. No. 826,471, Feb. 5, 1986, abandoned, which is a continuation-in-part of Ser. No. 668,449, Nov. 5, 1984, abandoned. This application Sep. 6, 1988, Ser. No. 240,984

Int. Cl.[4] G01N *21/11, 33/48*

U.S. Cl. 422—102 **25 Claims**

1. A sample preparation apparatus comprising:

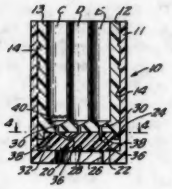
a disposable sample preparation container having a top and a bottom, said container comprising,

a magazine having a top and a bottom located in the container,

and having a vertical axis,

a plurality of independent sample holding and preparation chambers in the magazine, spaced about said axis; each chamber including means defining a mouth at a top thereof near the top of the magazine and means defining a port at a bottom thereof near the bottom of the magazine, and having a volume sufficient for temporary sample storage, at least one of said mouths being free of fixed fluid communication means; and a distributor valve positioned beneath the magazine; said valve including a top and a bottom; and

said distributor valve including at least one fluid flow communication channel that extends between means defining at least two openings in said top of the valve; each of said at least two openings being adapted to establish fluid flow communication between the channel and a port of one of



said plurality of chambers of the magazine when one of the openings is located beneath the port;

the valve and the magazine being rotatable relative to one another about the axis of the magazine, so that said at least two openings in the top of the valve can be aligned beneath the ports of different combinations of chambers to provide fluid flow communication between such different combinations of chambers through the channel.

4,889,693

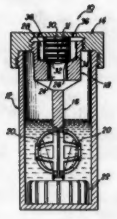
APPARATUS FOR VENTING OF GASES FROM CONTACT LENS CASES

Kai C. Su, Alpharetta, and Jack C. White, Stone Mountain, both of Ga., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 22, 1988, Ser. No. 146,954

Int. Cl.[4] A61L *2/18*

U.S. Cl. 422—113 **2 Claims**



1. An improvement in an appliance for disinfecting/sterilizing contact lenses of the type having a container with an open end, means for holding the lenses within an interior of said container, a cap that detachably closes said open end and having means defining an opening therethrough, and a passageway in said container which provides communication between the interior of said container and the atmosphere through said opening to provide a vent for gases liberated from disinfecting/sterilizing solution therein, the improvement comprising: said passageway being substantially vertically extending, a rigid supporting member extending across said passageway through said container and said container interior and defining therethrough a bore communicating with said passageway and with said interior, a valve means disposed within said passageway, said valve means being selectively movable between a normal, closed position which seals said passageway and an open position which allows gases to exit said container through said passageway and through said opening in said cap, said valve means comprising a deformable plug being posi-

tioned within said bore and comprising a circular body having an open bottom portion which defines a chamber and a top on said body, said top having a slit therethrough which is movable into said open position by gas being liberated from solution in said container.

4,889,694

RECOVERY OF ZINC VALUES FROM ZINC AND IRON-BEARING SULFIDE MATERIALS

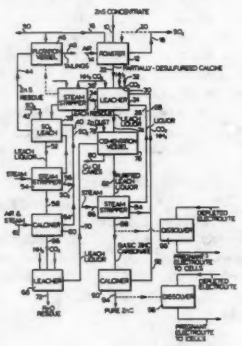
Donald R. Spink, Waterloo, and Jerry Y. Stein, Thornhill, both of Canada, assignors to University of Waterloo, Waterloo, Canada

Continuation-in-part of Ser. No. 829,927, Feb. 18, 1986, abandoned. This application May 16, 1988, Ser. No. 194,158

Claims priority, application United Kingdom, Feb. 20, 1985, 8504364

Int. Cl.[4] C01G *9/03, 49/02*

U.S. Cl. 423—110 **46 Claims**



1. A process of treating iron-bearing zinc sulfide material, which comprises:

contacting said zinc sulfide material with an oxidizing gas containing molecular oxygen at a temperature of at least about 900° C. and below the sintering temperature of said material to effect desulfurization and to convert zinc and iron values contained in said material to oxide form while retaining residual sulfide-sulfur throughout said contacting step and in a partialiy-desulfurized product resulting therefrom in an amount such that at least about 90% of the iron values are present in the product in the form of ferrous oxide,

subsequently recovering the zinc and iron values in oxide form from said partially-desulfurized product while retaining zinc values in sulfide form in said product, and

returning, following said removal of said zinc and iron values in oxide form, the retaining zinc sulfide values to said contacting step.

4,889,695

RECLAIMING SPENT POTLINING

J. Finley Bush, Plum Boro, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

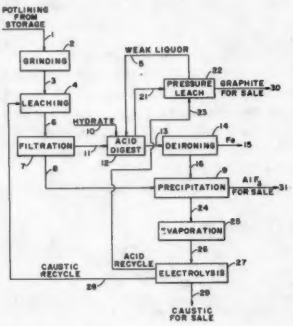
Filed Feb. 20, 1985, Ser. No. 703,322

Int. Cl.[4] C01B *31/02*

U.S. Cl. 423—132 **13 Claims**

1. The process for recovering halogen from carbonaceous material comprising:

(a) leaching carbonaceous material containing halogen with a caustic solution to produce a halogenrich basic liquor and a carbonaceous solid; and



(b) contacting said carbonaceous solid with an acid bath of aluminum sulfate and sulfuric acid to produce a halogenrich acid liquor.

4,889,696

CHEMICAL REACTOR FOR NITRIC ACID

Dwaine L. Klarstrom, Kokomo, Ind., assignor to Haynes International, Inc., Kokomo, Ind.

Division of Ser. No. 898,568, Aug. 21, 1986, Pat. No. 4,762,682. This application May 2, 1988, Ser. No. 189,001

Int. Cl.[4] B01J *35/00*

U.S. Cl. 422—211 **2 Claims**

1. A chemical reactor apparatus of the type used to manufacture nitric acid by the oxidation of ammonia at high temperatures comprising a bed of platinum catalyst wires through which the ammonia is passed to promote the reaction, and a support grid for said bed of catalyst which is fabricated from a nickel base alloy adapted to resist the high temperature corrosive environment, Wherein the improvement comprises

said support grid being constructed of material consisting essentially of from 20 to 24% chromium, from 10 to 20% tungsten, from 1.0 to 3.5% molybdenum, from 0.3 to 1.0% manganese, from 0.2 to 0.75% silicon, about 10 to 20% cobalt and the balance being nickel plus normal impurities and adventitious elements but provided that the calculated N_v number is no more than about 2.5.

4,889,697

METHOD OF REFINING FERROUS ION-CONTAINING ACID SOLUTION

Tsutomu Fukushima; Tsugio Nakao, both of Tokyo; Kasane Yamashita, Kawasaki; Takao Komuro, Hoya, and Katsuhiro Nishi, Yokohama, all of Japan, assignors to NKK Corporation and Kokan Mining Co., Ltd., both of Tokyo, Japan

Filed Dec. 5, 1988, Ser. No. 280,378

Claims priority, application Japan, Dec. 10, 1987, 62-312637

Int. Cl.[4] C01G *49/04, 49/06*

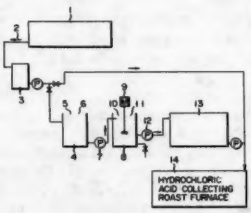
U.S. Cl. 423—140 **11 Claims**

1. A method of refining a ferrous ion-containing acid solution, said method comprising the steps of:

a first step of adding at least one metal selected from the group consisting of Al, Cr, V, B, and Zn or an acid solution of said metal to a ferrous ion-containing acid solution, and dissolving said metal or the acid solution thereof uniformly in the ferrous ion-containing acid solution;

a second step of adding alkali solution to the ferrous ion-containing acid solution obtained by said first step, thereby neutralizing the acid solution to a pH value of 3.5 to 6 and crystallizing a hydroxide of said metal; and

a third step of adding at least one of an anionic and a non-ionic coagulant to the neutralized acid solution obtained



by said second step, thereby coagulating and precipitating the crystallized hydroxide of said metal.

4,889,698

PROCESS FOR REMOVAL OR MERCURY VAPOR AND/OR VAPOR OF NOXIOUS ORGANIC COMPOUNDS AND/OR NITROGEN OXIDES FROM FLUE GAS FROM AN INCINERATOR PLANT

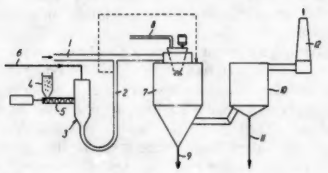
Jens T. Moller, Allerod; Niels Jacobsen, Copenhagen; Kirsten K. Nielsen, Holte, and Stig Rasmussen, Gadstrup, all of Denmark, assignors to A/S Niro Atomizer, Soborg, Denmark

Filed Jul. 8, 1987, Ser. No. 71,191

Claims priority, application Denmark, Jul. 16, 1986, 3381/86

Int. Cl.[4] B01D *53/34*

U.S. Cl. 423—210 **10 Claims**



1. A process for removal of mercury vapor and/or vapor of noxious organic compounds and/or nitrogen oxides from a stream of hot flue gas exhausted from an incinerator plant and possibly containing fly ash, combined with a simultaneous removal of acidic components of the flue gas, by passing said stream at a temperature of 135°–400° C. into a spray absorption chamber wherein an aqueous liquid containing a basic absorbent is atomized to cool the flue gas at a temperature between 180° C. and 90° C. and to absorb acidic components from the flue gas, and simultaneously to evaporate the water in said aqueous liquid, thereby forming a particulate material containing reaction products of the basic absorbent with acidic components of the flue gas, and nonreacted absorbent, which particulate material together with the fly ash, if any, is separated from the flue gas in a particle separator downstream of the spray absorption chamber, comprising injecting powdery activated carbon in an amount of 1–800 mg per Nm^3 flue gas into the stream of flue gas at least one location selected from locations upstream of the spray absorption chamber, locations within the spray absorption chamber and locations downstream the spray absorption chamber but upstream of the particle separator, and separating said powdery carbon in the particle separator together with said particulate material.

4,889,699

PARTIAL OXIDATION PROCESS

Mitri S. Najjar, Hopewell Junction, N.Y., and Michael W. Becker, Westminster, Calif., assignors to Texaco Inc., White Plains, N.Y.

Continuation-in-part of Ser. No. 51,982, May 19, 1987, Pat. No. 4,826,627, and a continuation-in-part of Ser. No. 100,673, Sep. 24, 1987, Pat. No. 4,808,386. This application Jun. 20, 1988, Ser. No. 208,933

Int. Cl.[4] C10J *3/46*

U.S. Cl. 423—210 **34 Claims**

1. A process for the production of gaseous mixtures comprising H_2+CO by the partial oxidation of a sulfur-containing feedstock comprising a heavy liquid hydrocarbonaceous fuel having a nickel and vanadium-containing ash or a solid carbonaceous fuel having a nickel and vanadium-containing ash, or mixtures thereof; and said feedstock includes a minimum of 0.1 wt. % of sulfur, greater than about 7 parts per million of silicon; and said ash includes a minimum of 2.0 wt. % vanadium, and a minimum of 1.0 wt. % of nickel and also iron, aluminum, calcium, sodium, and/or potassium; said process comprising:

(1) mixing together an iron-containing additive with said feedstock; wherein the weight ratio of iron-containing additive to ash in the reaction zone in (2) is in the range of about 0.1–10.0 to 1.0, and there is at least 2 parts by weight of iron for each part by weight of vanadium;

(2) reacting said mixture from (1) at a pressure in the range of about 2 to 250 atmosphere in a down-flowing free-flow unobstructed refractory lined vertical reaction zone of a partial oxidation gas generator with a free-oxygen containing gas in a reducing atmosphere and in the presence of a gaseous slag fluidizing agent which is introduced at the top of the reaction zone in a sufficient amount so as to maintain a uniform temperature throughout the reaction zone in the range of about 2100° F. to 3000° F. and said gaseous slag fluidizing agent is selected from the group consisting of superheated steam, CO_2, and mixtures thereof, to produce a hot raw effluent gas stream comprising H_2+CO and entrained molten slag; wherein an equilibrium oxygen concentration is provided in the gas phase in the reaction zone with a partial pressure in the range of about 1.18×10^{-13} to 5.64×10^{-9} atmospheres, an equilibrium sulfur concentration is provided in the gas phase in the reaction zone with a partial pressure in the range of about 2×10^{-6} to 2.12×10^{-4} atmospheres, the free O/C atomic ratio is in the range of about 0.6 to 1.6, the H_2O/-liquid hydrocarbonaceous fuel and/or solid carbonaceous fuel weight ratio is in the range of about 0.1 to 5.0, and about 90 to 99.9 wt. % of the carbon in said liquid hydrocarbonaceous fuel and/or solid carbonaceous fuel is converted into carbon oxides; and where in said reaction zone a first portion of the said iron-containing additive combines with at least a portion of the nickel, iron and sulfur constituents found in the feedstock to produce a first liquid phase washing agent; a second portion of said iron-containing additive combines with at least a portion of the silicon, aluminum, calcium, sodium and/or potassium, and iron constituents found in the feedstock to produce a second liquid phase washing agent; and wherein the first and second liquid phase washing agents collect and transport substantially all of the vanadium-containing oxide laths and spinels and other ash components and refractory out of the reaction zone, and there is substantially no build-up of slag on the inside walls of the reaction zone; and

(3) separating nongaseous materials from said hot raw effluent gas stream.

4,889,700

PROCESS AND DEVICE FOR SELECTIVE EXTRACTION OF H_2S FROM AN H_2S-CONTAINING GAS

Jean Elgue, Lons; Olivier Oliveau, and Jean-Louis Peytavy, both of Lescar, all of France, assignors to Societe Nationale Elf Aquitaine (Production), Paris, France

PCT No. PCT/FR86/00343, § 371 Date Jun. 3, 1987, § 102(e) Date Jun. 3, 1987, PCT Pub. No. Wo87/01962, PCT Pub. Date Apr. 9, 1987

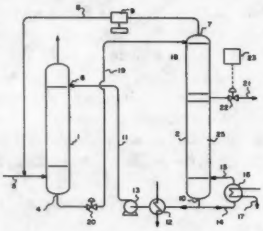
PCT Filed Oct. 3, 1986, Ser. No. 67,259

Claims priority, application France, Apr. 10, 1985, 85 14743

The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.

Int. Cl.[4] C01B *17/16*

U.S. Cl. 423—220 21 Claims



1. A process for the selective extraction of H_2S from a gas containing a plurality of gaseous acid compounds, one of which is H_2S, by operating in a first column comprising an absorption zone and a second column comprising a mixed treatment zone provided with an upper enrichment zone and a lower regeneration zone, said process comprising the steps of

introducing into the absorption column an absorbent liquid for acid compounds, which is selective for H_2S and regeneratable by heating, and circulating said absorbent liquid and the gas to be treated in countercurrent in said absorption zone to yield a treated gas with a reduced level of H_2S and a stream of absorbent liquid charged with said gaseous acid compounds,

transporting said stream of absorbent liquid charged with said gaseous acid compounds to the second column and introducing said stream of charged absorbent liquid into the upper enrichment zone, said stream of charged absorbent liquid travelling through the enrichment zone to the regeneration zone at the bottom of the second column,

heating the absorbent liquid charged with the gaseous acid compounds in the lower regeneration zone, thereby releasing said gaseous acid compounds and obtaining a regenerated absorbent liquid and also a gaseous acid effluent, the latter containing the released gaseous acid compounds and being richer in H_2S than the gaseous acid compound fraction of the gas to be treated,

transporting the H_2S-rich gaseous acid effluent into the upper enrichment zone by stripping said effluent with the absorbent liquid vapor generated by said heating,

contacting in said upper enrichment zone the H_2S-rich gaseous acid effluent with the charged absorbent liquid flowing from the absorption column and forming an equilibrium between the H_2S-rich gaseous acid effluent and said charged absorbent liquid,

tapping at the equilibrium location a fraction of the H_2S-rich gaseous effluent available at said location,

controlling the heat supplied to the lower regeneration zone to maintain a temperature difference of no more than about 30° C. between the temperature in the enrichment zone at the tapping level and the temperature of the absorbent liquid entering the absorption column, and

collecting at the top of the second column upper enrichment zone the remainder of the gaseous acid effluent resulting from the regeneration of the charged absorbent liquid in the lower regeneration zone.

4,889,701

PROCESS FOR OXIDIZING MULTIVALENT METALS

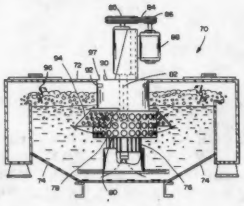
Timothy A. Jones, Carrollton, and Earl S. Snavely, Jr., Arlington, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 816,655, Jan. 6, 1986, abandoned, which is a continuation-in-part of Ser. No. 690,545, Jan. 11, 1985, Pat. No. 4,649,032, which is a continuation-in-part of Ser. No. 361,947, Mar. 25, 1982, abandoned, which is a continuation-in-part of Ser. No. 336,796, Jan. 4, 1982, abandoned. This application Jan. 12, 1987, Ser. No. 2,593

The portion of the term of this patent subsequent to Feb. 12, 2002, has been disclaimed.

Int. Cl.[4] B01D *53/18, 53/34;* C01B *17/05*

U.S. Cl. 423—220 16 Claims



1. A process for oxidizing a metal from a lower to a higher valence state comprising:

(a) introducing an aqueous solution of the metal at the lower valence state, the solution further comprising a dispersed solid phase, into an oxidizing zone;

(b) forming a relatively low pressure area below the surface of the solution by rotating a rotating means below the surface of the solution;

(c) providing a communication means between the relatively low pressure area and a supply of an oxygen-containing gas, thereby introducing into the low pressure area and dispersing within the solution so much of the gas as to provide at least about 300% excess of stoichiometric oxygen (O_2) with respect to the metal at the lower valence state, the pressure in the relatively low pressure area being sufficient to draw the oxygen-containing gas into the oxidizing zone; and,

(d) subjecting the solution and the thus-obtained dispersed gas to a sufficient shearing force to finely divide the gas into bubbles within the solution.

4,889,702

PROCESS FOR REMOVING METALLIC CONSTITUENTS FROM DUST OBTAINED DURING THE ELECTROTHERMAL PRODUCTION OF YELLOW PHOSPHORUS

Friedrich Kolkmann, Brühl, and Klaus Jödden, Erftstadt, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 112,382, Oct. 22, 1987, abandoned. This application Nov. 29, 1988, Ser. No. 277,567

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1986, 3637670

Int. Cl.[4] C01B *25/01, 25/02, 25/04*

U.S. Cl. 423—323 4 Claims

1. A process for removing metallic constituents selected from the group consisting of zinc, cadmium, lead, silver, gallium and germanium from dust electrostatically separated from a gas mixture comprising carbon monoxide and phosphorus in vapor form obtained during the production of yellow phos-

phorus from a feed material comprising crude phosphate in an electrothermal phosphorus furnace, said dust being relatively high in its content of metallic constituents as compared to said feed material, said process comprising: initially mixing said dust of relatively high metallic content compared to said feed material with water in a ratio by weight of 1:(2 to 5) with the resultant formation of a suspension; filtering the suspension; calcining the resulting filter cake, also of relatively high metallic content, with continuous agitation under oxidizing conditions at temperatures of 300° to 800° C.; grinding the resulting calcined matter, also of relatively high metallic content, and mixing it with carbon in a ratio by weight of 10:1 to 10:3; making the mixture with phosphoric acid into compact material, also of relatively high metallic content; treating the compact material at temperatures of 950° to 1200° C. under reducing conditions with volatilization of the metallic constituents; and separating the volatilized metallic constituents by condensing them.

4,889,703

PROCESS FOR PRODUCING TUNGSTOSILICIC ACID

Kenneth T. Reilly; Alan D. Douglas, and Henry E. Hoffman, all of Towanda, Pa., assignors to GTE Products Corporation, Stamford, Conn.

Continuation of Ser. No. 131,256, Dec. 7, 1987, abandoned, which is a continuation of Ser. No. 919,998, Oct. 17, 1986, abandoned. This application Jun. 16, 1989, Ser. No. 368,078

Int. Cl.[4] C01B *33/20*

U.S. Cl. 423—326 5 Claims

1. A process for producing tungstosilicic acid, said process consisting essentially of:

(a) adding sodium silicate to a first solution of sodium tungstate, while assuring that the pH of the resulting mixture is from about 2 to about 6, with the pH adjustments being made with a cation exchange resin on the hydrogen cycle, to form a second solution;

(b) removing solids from said second solution;

(c) digesting said second solution at a temperature greater than about 50° C.; and

(d) contacting the resulting digested solution with a cation exchange resin on the hydrogen cycle to produce a third solution which is essentially a tungstosilicic acid solution, said third solution being produced essentially without formation of silica gel, said third solution containing at least about 99% by weight of the starting tungsten as tungstosilicic acid.

4,889,704

PREPARATION OF HYDROXYLAMMONIUM SALTS

Hugo Fuchs; Josef Ritz, both of Ludwigshafen; Erwin Thomas, Freinsheim, and Franz-Josef Weiss, Neuhofen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 20, 1988, Ser. No. 184,085

Claims priority, application Fed. Rep. of Germany, Apr. 24, 1987, 3713733

Int. Cl.[4] C01B *21/087, 21/088, 21/093*

U.S. Cl. 423—387 5 Claims

1. In a process for preparing a hydroxylammonium salt by the catalytic reduction of nitrogen monoxide with hydrogen at elevated temperature in a dilute aqueous solution of a mineral acid and in the presence, in suspension, of a supported platinum catalyst, the improvement which comprises: preparing said supported platinum catalyst, by

(a) adding to an aqueous solution of a platinum salt containing a suspended support

(i) a sulfur compound selected from the group consisting of alkali metal dithionite, alkali metal sulfide, sulfurous acid, alkali metal sulfite and derivatives of sulfoxylic acid with formaldehyde, and

(ii) an aminopolycarboxylic acid,

(b) precipitating platinum on the support from said aqueous solution by adding a reducing agent, and

(c) separating the supported platinum catalyst from the aqueous solution containing said aminopolycarboxylic acid.

4,889,705

HYDROGEN PEROXIDE METHOD USING OPTIMIZED H+ AND BR− CONCENTRATIONS

Lawrence W. Gosser, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 13, 1988, Ser. No. 193,842

The portion of the term of this patent subsequent to Jul. 21, 2004, has been disclaimed.

Int. Cl.[4] C01B *15/02*

U.S. Cl. 423—584 3 Claims

1. A process for making hydrogen peroxide, comprising contacting hydrogen and oxygen in an aqueous reaction medium containing no more than about 2% by weight of an organic component, in the presence of a catalyst comprising platinum, palladium or a combination thereof and H^+ ions and Br^- each of said ions being, independently of the other, at a concentration of from about 0.001 M to about 0.05 M.

4,889,706

METHOD OF MANUFACTURING FINE POWDER OF LEAD STANNATE

Satoru Uedaira; Masayuki Suzuki, both of Yokohama; Hiroshi Yamanoi, Hiratsuka, and Hidemasa Tamura, Yokohama, all of Japan, assignors to Sony Corporation, Tokyo, Japan

PCT No. PCT/JP84/00286, § 371 Date Feb. 5, 1985, § 102(e) Date Feb. 5, 1985, PCT Pub. No. WO84/04911, PCT Pub. Date Dec. 20, 1984

PCT Filed Jun. 5, 1984, Ser. No. 706,922

Claims priority, application Japan, Jun. 6, 1983, 58-100593

Int. Cl.[4] C01G *19/00, 21/00*

U.S. Cl. 423—593 8 Claims

1. A method for manufacturing fine powder of lead stannate which comprises reacting a hydrolyzed product of a tin compound or water soluble stannate with a lead salt in an alkaline aqueous solution having a pH of at least 8 so as to precipitate a fine powder of lead stannate.

4,889,707

COMPOSITION AND METHOD FOR RADIATION SYNOVECTOMY OF ARTHRITIC JOINTS

Delbert E. Day, Rolla, and Gary J. Ehrhardt, Columbia, both of Mo., assignors to The Curators of the University of Missouri, Columbia, Mo.

Filed Jan. 29, 1988, Ser. No. 150,154

Int. Cl.[4] A61K *43/00;* A61B *6/00*

U.S. Cl. 424—1.1 25 Claims

1. A method for carrying out radiation synovectomy of arthritic joints which comprises administering to a mammal affected with an arthritic joint an effective amount of microspheres comprising a biologically compatible material selected from the group consisting of aluminosilicate, magnesium aluminosilicate, lithium silicate, lithium aluminosilicate, lithium aluminoborate, lithium germanate, lithium aluminogermanate,

potassium silicate, potassium aluminosilicate, potassium aluminoborate, potassium germanate and potassium aluminogermanate and containing a beta radiation emitting radioisotope chemically dissolved in and distributed substantially uniformly throughout said glass material and being selected from the group consisting of samarium-153, holmium-166, erbium-169, dysprosium-165, rhenium-186, rhenium-188 and yttrium-90.

4,889,708

FUMIGANT SYSTEM

Sherif Latif, Ashfield, and Robert F. Ryan, Sans Souci, both of Australia, assignors to The BOC Group, Inc., Murray Hill, N.J.

Continuation of Ser. No. 245,876, Sep. 16, 1988, abandoned, which is a division of Ser. No. 877,824, Jun. 24, 1986. This application Feb. 22, 1989, Ser. No. 314,311

Claims priority, application Australia, Jun. 27, 1985, PH1239

Int. Cl.[4] H01N *25/02*

U.S. Cl. 424—43 **6 Claims**

1. A nonflammable fumigant system, which comprises:

a liquified gas contains adapted for release of a gaseous fumigant; and

a pressurized gaseous fumigant mixture of a liquified inert gas and phosphine charged into said liquified gas container, said phosphine being present in an amount to provide up to about 3% by volume phosphine in released gaseous fumigant.

4,889,709

AEROSOL FOAM WITH ADSORBATE AND CONTAINER CONTAINING SAME

Leonard Mackles, New York, N.Y., and Leonard Chavkin, Bloomsbury, N.J., assignors to Product Resources International, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 5,597, Jan. 21, 1987, Pat. No. 4,752,465, which is a continuation-in-part of Ser. No. 778,026, Sep. 20, 1985, Pat. No. 4,639,367, which is a continuation-in-part of Ser. No. 713,294, Mar. 18, 1985, abandoned. This application Jun. 17, 1988, Ser. No. 208,254

The portion of the term of this patent subsequent to Jun. 21, 2005, has been disclaimed.

Int. Cl.[4] A61K *9/00*; **A61L** *9/04*

U.S. Cl. 424—45 **23 Claims**

1. An edible, anhydrous aerosol foam composition comprising a foamable liquid oil, a foaming agent, a propellant, and dispersed solid particles, said propellant being present in an amount sufficient to produce a stable, measurable foam but insufficient to produce a spray when said composition is ejected through an aerosol valve, and said dispersed solid particles being at least 15% by weight of said composition and including an active therapeutic agent adsorbed on magnesium aluminum silicate, said active therapeutic agent being selected from the group consisting of amines and fatty acid-amine salts.

4,889,710

AEROSOL FOAM BAIT INSECTICIDE

John D. Hagarty, Racine County, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.

Continuation of Ser. No. 727,932, Apr. 26, 1985, abandoned. This application Oct. 24, 1986, Ser. No. 922,926

Int. Cl.[4] A01N *25/06*

U.S. Cl. 424—45 **8 Claims**

1. A stable-foam insect-bait aerosol composition, adapted to be applied into a crevice or a crack, for controlling the populations of crawling insects selected from the group consisting of ants, cockroaches, crickets and silverfish, the insect-bait aerosol composition comprising:

an insect attractant, present in an amount of about 0.1 to about 10% by weight of the insect-bait composition:

an insect toxicant, present in an amount of about 0.01 to about 10% by weight of the insect-bait composition;

an insect-edible, foamable, film-forming polymeric carrier, selected from the group consisting of polyvinyl alcohol, polyvinyl pyrrolidone, and polyvinyl acetate and present in an amount of from about 0.5 to about 10% weight of the insect-bait composition, for carrying both the attractant and the toxicant, the film-forming carrier being characterized as being adapted to be applied into the crevice or the crack and as being able to form a insect-edible foam matrix therein, both the attractant and the toxicant being contained within the insect-edible foam matrix, the crevice-applied or crack-applied foam matrix being characterized as initially expanding and thereafter contracting thereby presenting an insect-edible surface which is accessible to the crawling insect, the population of which is to be controlled;

an effective amount of an insect-edible, water-soluble emulsifier, for emulsifying the film-forming polymeric carrier thereby enabling the foamable polymeric carrier to form the insect-edible foam matrix:

an effective amount of a propellent, for causing the emulsified, foamable, film-forming polymeric carrier to form the insect-edible foam matrix; and

water, present in an amount of up to about 90% by weight of the insect-bait composition.

4,889,711

COMPOSITION FOR ANTIPERSPIRANT AEROSOL

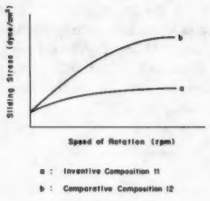
Masanobu Kai, and Etsuko Chiku, both of Tokyo, Japan, assignors to Kao Corporation, Tokyo, Japan

Continuation of Ser. No. 943,704, Dec. 19, 1986, abandoned. This application Aug. 8, 1988, Ser. No. 229,757

Claims priority, application Japan, Jan. 14, 1986, 5746/1986

Int. Cl.[4] A61K *7/34, 7/38, 9/12*

U.S. Cl. 424—47 **17 Claims**



1. In an antiperspirant aerosol composition, comprising:

an aluminum or a zirconium astringent salt;

an oil which is at least one member selected from the group consisting of liquid paraffin, isopropyl myristate, isopropyl palmitate, squalane, 2-octyldodecyl oleate, myristyl myristate, and volatile cyclic silicones; and

a propellent, wherein the improvement comprises preventing wetness immediately after spraying by incorporating;

a liquid organopolysiloxane-treated talc or sericite;

wherein the amount of said astringent salt and said liquid organopolysiloxane treated talc or sericite is 1 to 10 wt.% of said antiperspirant aerosol composition, and

wherein the total amount of said astringent salt, said oil, and said liquid organopolysiloxane treated talc or sericite is 2 to 55 wt.% of said antiperspirant aerosol composition comprising the propellant.

4,889,712

ANTICALCULUS ORAL COMPOSITION

Abdul Gaffar, Princeton; Shek-Hong H. Lau, Dayton; John Affilito, Brookside, and Arline M. Nykvist, Bloomsbury, all of N.J., assignors to Colgate-Palmolive Company, Piscataway, N.J.

Filed Mar. 18, 1988, Ser. No. 169,915
The portion of the term of this patent subsequent to Dec. 9, 2003, has been disclaimed.
Int. Cl.[4] A61K *7/16, 7/18*
U.S. Cl. 424—52 19 Claims

1. In an anticalculus oral composition containing in an orally acceptable vehicle one or a mixture of water soluble linear molecularly dehydrated alkali metal or ammonium polyphosphate salts as essential anticalculus agent, an amount of a fluoride ion source sufficient to supply about 25 ppm to about 2,000 ppm of fluoride ions, and one or a mixture of water soluble alkali metal or ammonium synthetic anionic polymeric polycarboxylate salts, the improvement comprising employing in said composition a polyphosphate ion:polycarboxylate salt weight ratio ranging from about 0.3:1 to about 2.5:1.

4,889,713

ANTICALCULUS ORAL COMPOSITIONS

Abdul Gaffar, Princeton, and Thomas G. Polefka, Somerset, both of N.J., assignors to Colgate-Palmolive Company, Piscataway, N.J.

Continuation of Ser. No. 938,938, Dec. 8, 1986, Pat. No. 4,808,400, which is a continuation of Ser. No. 775,851, Sep. 13, 1985, Pat. No. 4,627,977. This application Feb. 8, 1989, Ser. No. 307,718
Int. Cl.[4] A61K *7/16, 7/18*
U.S. Cl. 424—52 20 Claims

1. In an anticalculus oral composition containing in an orally acceptable vehicle one or a mixture of water soluble alkali metal tripolyphosphate salts as essential anticalculus agents, and an amount of a fluoride ion source sufficient to supply about 25 ppm. to about 2,000 ppm. of fluoride ions, the improvement wherein salivary hydrolysis of P—O—P bonds in said tripolyphosphate salts by phosphatase enzymes is inhibited consisting essentially of including in said composition an effective inhibiting amount therefor within the range of about 0.05 to about 3 wt.% of a water soluble alkali metal or ammonium synthetic anionic linear polymeric polycarboxylate.

4,889,714

METHOD FOR RETARDING DENTAL PLAQUE BY KILLING STREPTOCOCCUS SANGUIS

Perry A. Ratcliff, 7125 E. Lincoln Dr., Scottsdale, Ariz. 85253

Division of Ser. No. 88,609, Aug. 24, 1987, Pat. No. 4,818,519, which is a continuation-in-part of Ser. No. 24,329, Mar. 10, 1987, Pat. No. 4,837,009, which is a continuation of Ser. No. 947,079, Dec. 29, 1986, Pat. No. 4,689,214, which is a continuation of Ser. No. 17,241, Dec. 29, 1986, Pat. No. 4,696,811, each is a continuation of Ser. No. 846,342, Mar. 31, 1986, abandoned, which is a continuation of Ser. No. 636,027, Jul. 30, 1984, abandoned. This application Dec. 2, 1988, Ser. No. 279,360
Int. Cl.[4] A61K *7/20*
U.S. Cl. 424—53 6 Claims

1. A method for retarding the formation of dental plaque, said method comprising the step of reducing the motility and mytotic activity of streptococcus sanguis within the oral cavity, said reducing step including the step of applying stabilized chlorine dioxide in aqueous solution.

4,889,715

COMPOSITION CONTAINING ORGANOGERMANIUM COMPOUND AND IMMUNITY ADJUSTING AGENT COMPRISING THE COMPOSITION

Kiichi Sawai, Funabashi; Masayasu Kurono; Juichi Awaya, both of Nagoya; Akio Kojima, Kasugai, and Hideaki Ninomiya, Nagoya, all of Japan, assignors to Sanwa Kagaku Kenkyusho Co., Ltd., Aichi, Japan

Filed Jul. 25, 1988, Ser. No. 224,279
Claims priority, application Japan, Dec. 25, 1984, 59-272057
The portion of the term of this patent subsequent to Sep. 26, 2005, has been disclaimed.
Int. Cl.[4] A61K *31/79, 31/555, 31/28*
U.S. Cl. 424—80 2 Claims

1. A stabilized 3-oxygermylpropionic acid polymer composition, which comprises 0.01 to 1 weight % of 3-oxygermylpropionic acid polymer of the formula

$$[GeCH_2CH_2COOH]_nO_{1.5n}$$

wherein n is an integer of 1 or more and 0.5 to 10 weight % of a high molecular weight substance as a stabilizer for the polymer and selected from the group consisting of serum, serum albumin, pepsin and polyvinylpyrrolidone.

4,889,716

METHOD FOR TREATING HERPES AND CHRONIC INFLAMMATORY INTESTINAL TRACT DISEASE

Helmut Keller, Blumenstr. 32, 8646 Nordhalben, Fed. Rep. of Germany

Division of Ser. No. 892,226, Jul. 31, 1986. This application Aug. 15, 1988, Ser. No. 210,891
Claims priority, application European Pat. Off., Jul. 31, 1985, 85109616.4; Jul. 31, 1985, 85109617.2
Int. Cl.[4] A61K *35/78*
U.S. Cl. 424—195.1 5 Claims

1. A method for treating chronic inflammatory intestinal tract diseases comprising the administration to a host afflicted by same juice or the aqueous solution of juice extracted from Dionaea muscipula.

4,889,717

BARRIER MATERIAL FOR GEL SEALANT-CABLE JACKET INTERFACE

Anne E. Covington, Apex; Thomas A. Hunter, Cary, and Keith Dawes, Raleigh, all of N.C., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 37,747, Apr. 13, 1987, abandoned. This application Apr. 21, 1988, Ser. No. 184,469
Int. Cl.[4] B32B *3/26*
U.S. Cl. 428—304.4 9 Claims

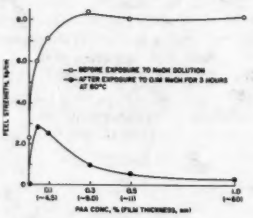
1. An assembly comprising a plasticized polymeric article, a gel material adjacent a surface of said polymeric article and a foam barrier disposed as a layer between said article and said gel material for substantially preventing migration of plasticizer from said article into said gel material.

4,889,718

POLYACID MACROMOLECULE PRIMERS

Toshifumi Sugama, Mastic Beach, N.Y., assignor to Associated Universities, Inc., Washington, D.C.

Filed May 2, 1988, Ser. No. 188,974
Int. Cl.[4] C09J *7/02*; B32B *15/08*
U.S. Cl. 428—343 12 Claims



1. A formed polymeric adhesive/polyacid/oxidized aluminum adherend joint system wherein the polyacid is water-soluble has a molecular weight >50,000 and is applied in near monolayer.

4,889,719

MICROENCAPSULATED ORGANOPHOSPHORUS INSECTICIDAL COMPOSITION FOR AGRICULTURAL USE

Toshiro Ohtsubo, Hyogo; Shigenori Tsuda, Kyoto; Yukio Manabe, Osaka; Kiyoshi Kasamatsu; Hisami Takeda, both of Kyogo, and Kozo Tsuji, Nara, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan

Filed Jul. 6, 1988, Ser. No. 215,850
Claims priority, application Japan, Jul. 6, 1987, 62-169545
Int. Cl.[4] A01N *25/34*
U.S. Cl. 424—408 2 Claims

1. A microencapsulated insecticidal composition which comprises an organophosphorus insecticide selected from the group consisting off fenitrothion, cyanophos, salithion, malathion, fenthion, diajinon, chloropyrifos, prothiophos and dichlorvos encapsulated in a wall formed of a polyurea and having an average particle diameter of not more than 80 μm, a wall thickness of not more than 0.3 μm and a ratio of an average particle diameter/wall thickness of not less than 250.

4,889,720

SUSTAINED RELEASE DOSAGE FORM FOR USE WITH TISSUES OF THE ORAL CAVITY

Ryoji Konishi, Kegawa, Japan, assignor to Teikoku Seiyaku Kabushiki Kaisha, Kagawa, Japan

Filed Aug. 31, 1987, Ser. No. 90,916
Claims priority, application Japan, Sep. 1, 1986, 206590
Int. Cl.[4] A61F *7/02*
U.S. Cl. 424—448 10 Claims

1. A controlled release dosage form for application to oral cavity tissue, comprising:

an adhesive layer having a first side adherable to oral cavity tissue;

a reservoir containing an active substance positioned over a second side of the adhesive layer; and

a controlled release layer covering the reservoir and providing for a delayed release of the active substance into the oral cavity wherein the first side of the adhesive layer adherable to oral cavity tissue is left uncovered by the controlled release layer.

4,889,721

SUSTAINED-RELEASE PERCUTANEOUS PREPARATIONS

Yoshio Ueda, Kobe; Sotoo Asakura, Kyoto; Yoshio Murakami, Takatsuki, and Toshiomi Nakate, Minoo, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Jul. 15, 1988, Ser. No. 219,365
Claims priority, application Japan, Jul. 24, 1987, 62-185790
Int. Cl.[4] A61F *13/02*
U.S. Cl. 424—448 10 Claims

1. A sustained-release percutaneous preparation which has at least two adhesive layers wherein a solid powder is dispersed in one of said adhesive layers other than the layer farthest from the skin on application and a drug is contained at least in said layer farthest from the skin on aplication, wherein said adhesive is an acrylic ester adhesive and/or a silicone adhesive.

4,889,722

METHOD FOR INHIBITING POST-SURGICAL ADHESION FORMATION BY THE TOPICAL ADMINISTRATION OF TISSUE PLASMINOGEN ACTIVATOR

Warren D. Sheffield, Levanon, N.J., and Gere S. diZerega, Pasadena, Calif., assignors to Ethicon, Inc., Somerville, N.J.

Continuation-in-part of Ser. No. 924,723, Oct. 29, 1986, abandoned, which is a continuation-in-part of Ser. No. 809,536, Dec. 16, 1985, abandoned. This application Feb. 19, 1988, Ser. No. 157,818
Int. Cl.[4] A61K *9/06, 37/54*; A61L *2/00*
U.S. Cl. 424—450 15 Claims

1. A process for inhibiting post-surgical adhesion formation in mammals which comprises the topical locally effective administration to the injured tissue surface site of surgical trauma of an effective amount of a sterile composition including as an active ingredient tissue plasminogen activator, for a period of time sufficient to inhibit the formation of post-surgical adhesions.

4,889,723

PHARMACEUTICAL COMPOSITIONS COMPRISING ESTERS OR AMIDES AS ACTIVE INGREDIENTS

Soonih Kim; Kazuhisa Takeda, and Seiei Sasatani, all of Osaka, Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan

Filed Apr. 13, 1988, Ser. No. 180,933
Claims priority, application Japan, Apr. 13, 1987, 62-88785
Int. Cl.[4] H61K *37/22*
U.S. Cl. 424—450 9 Claims

1. A pharmaceutical composition consisting essentially of an ester of a thromboxane analogue or an amide of a thromboxane analogue suspended or dissolved in a middle chain glyceride of a fatty acid of 4 to 10 carbon atoms or mixtures thereof.

4,889,724

STABLE AQUEOUS CISPLATIN SOLUTIONS

Rodney Kasan; Michael Seiffe, both of Raanana, and Haim Yellin, Ramat-Gan, all of Israel, assignors to Teva Pharmaceutical Industries Ltd., Israel

Continuation of Ser. No. 88,665, Aug. 24, 1987, abandoned. This application Aug. 4, 1988, Ser. No. 228,521
Claims priority, application Israel, Jul. 30, 1987, 83380
Int. Cl.[4] A61K *33/24*
U.S. Cl. 424—649 6 Claims

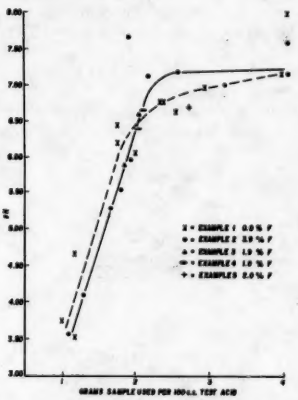
1. An aqueous injectable Cisplatin solution comprising 0.1–1.0 mg/ml of Cisplatin, 9–15 mg/ml of NaCl and 0.025–0.075 mg/ml of citric acid and having a pH of 3.0–6.0.

4,889,725

MEANS TO PROMOTE THE NEUTRALIZATION REACTION BETWEEN PARTICULATE CALCIUM CARBONATE AND IONIZED PHOSPHATE

Preston L. Veltman, 212 Old Country Rd., Severna Park, Md. 22146

Filed Apr. 17, 1987, Ser. No. 39,335
Int. Cl.[4] A01N *59/10*
U.S. Cl. 424—675 5 Claims



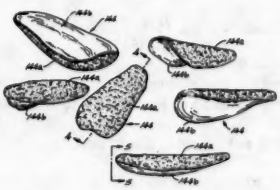
1. A pharmaceutical composition consisting essentially of calcium carbonate containing a minor amount of molecularly dispersed calcium fluoride, formed by the process of dispersing particulate calcium carbonate in a dilute aqueous solution of hydrofluoric acid and drying the treated product.

4,889,726

USING COCOA POWDER TO ENHANCE THE FLAVOR OF A MINT FLAVORED CHEWING GUM

Jayant C. Dave, Bloomingdale; David W. Record, River Forest; Jill M. Nespor, LaGrange, and Jeffrey S. Hook, Palos Hills, all of Ill., assignors to Wm. Wrigley Jr. Company, Chicago, Ill.

Filed Sep. 2, 1988, Ser. No. 240,833
The portion of the term of this patent subsequent to Dec. 26, 2006, has been disclaimed.
Int. Cl.[4] A23G *3/30*
U.S. Cl. 426—3 16 Claims



1. A non-chocolate flavored, mint-flavored chewing gum comprising:
gum base;
sweetener;
a mint flavoring agent; and
between about 0.08 and about 0.5 percent cocoa powder.

4,889,727

USING COCOA POWDER TO ENHANCE THE FLAVOR OF SYNTHETIC CHEWING GUM BASE

Jayant C. Dave, Bloomingdale; David W. Record, River Forest; Jill M. Nespor, LaGrange, and Jeffrey S. Hook, Palos Hills, all of Ill., assignors to Wm. Wrigley Jr. Company, Chicago, Ill.

Filed Sep. 2, 1988, Ser. No. 240,832
The portion of the term of this patent subsequent to Dec. 26, 2006, has been disclaimed.
Int. Cl.[4] A23G *3/30*
U.S. Cl. 426—3 22 Claims

1. A synthetic non-chocolate flavored chewing gum base comprising:
between about 10 and about 30 percent of a synthetic elastomer;
between about 20 and about 70 percent of a synthetic resin;
between about 0.3 and about 2.4 percent cocoa powder;
wherein said synthetic chewing base is substantially free of natural gum products.

4,889,728

CHEWING GUM AND A METHOD OF MANUFACTURING THE SAME

Masao Maeda, Hyogo; Michiyo Fukuse; Tohru Miyaaki, both of Osaka, and Toshio Miyake, Okayama, all of Japan, assignors to Kanebo, Ltd. and Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo, both of, Japan

Filed Mar. 16, 1988, Ser. No. 168,783
Int. Cl.[4] A23G *3/30*
U.S. Cl. 426—5 12 Claims

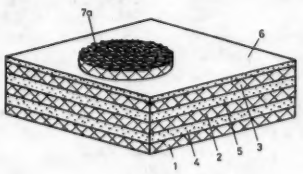
1. A kit comprising:
(A) a powdery chewing gum composition, and
(B) a liquid component, wherein (A) and (B) are separately contained in said kit;
said powdery chewing gum composition comprising a gum base, hydrous crystalline maltose, obtained by hydrating anhydrous crystalline maltose, a humectant and a gum selected from the group consisting of pullulan, gelatin and gum arabic;
said liquid component comprising water wherein (A) and (B) are mixed at time of use.

4,889,729

COATED EDIBLE ARTICLE WITH HOLDING MEMBER TO PREVENT FINGER SOILING

Rene F. Aujourd'hui, Lambergstrasse 4, 8610 Uster, Switzerland

Continuation of Ser. No. 673,594, Nov. 21, 1984, abandoned.
This application Jul. 6, 1987, Ser. No. 73,370
Claims priority, application Switzerland, Nov. 29, 1983, 6379/83
Int. Cl.[4] A21D *15/00*; A23G *3/00*
U.S. Cl. 426—94 11 Claims



1. A confection comprising:
(a) at least one wafer sheet;
(b) a coating which melts at or below body temperature, on an outer side of said at least one wafer sheet to form a wafer sheet and coating assembly; and
(c) an edible holding member applied to the surface of said

coating and held by said coating to said wafer sheet, said holding member being at least of a size large enough to be held by a fingertip but having a relatively small surface area in relation to the surface area of said coating so as not to affect the taste balance of the wafer sheet and coating assembly, said holding member being comprised of a substance which does not melt at or below body temperature, whereby the article can be handled without soiling the fingers.

4,889,730

CRISP FRUIT OR VEGETABLE SNACK PRODUCT AND PROCESS

Bruce A. Roberts, Batavia, and Alice L. Burkes, Cincinnati, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 18, 1988, Ser. No. 157,838
Int. Cl.[4] A23L *1/212*
U.S. Cl. 426—102 **35 Claims**

1. A method for the manufacture of a snack product comprising the steps of:

a. removing undesirable parts from whole pieces of edible plant matter;

b. subdividing said pieces of plant matter into smaller pieces;

c. pretreating said pieces with sugar until said pieces absorb from about 5% to about 25% of sugar by weight percent of said pieces;

d. draining said pieces until dewatered;

e. forming a mixture of said pieces with a foam composition so that the pieces to foam weight ratio is from about 2 to about 9;

f. forming said mixture into the desired shaped product;

g. drying said product at a temperature of from about 75° C. to about 120° C. for from about 60 minutes to about 250 minutes to a water activity of from about 0.05 to about 0.3 and a bulk density of from about 0.2 to about 0.6 so that said pieces substantially retain their original volume and said pieces are positioned with respect to one another in an open mat structure such that the snack product is characterized by a ratio of solids volume to total volume of from about 0.5 to about 0.85.

4,889,731

PACKAGE HAVING PEELABLE FILM

Allen C. Williams, Jr., Spartanburg, S.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.

Filed Feb. 12, 1988, Ser. No. 156,270
Int. Cl.[4] B65D *85/00*
U.S. Cl. 426—106 **9 Claims**

1. A package having a peelable film layer comprising:

(a) a product;

(b) a support web upon whose upper surface the product rests, said support web having at least one edge;

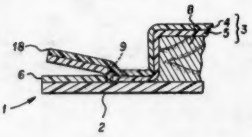
(c) a composite film enclosing the product said composite film comprising:

(1) a skin layer sealed to the support web around the periphery of the product; and,

(2) a peelable layer laminated or coextruded to the skin layer on the outer side of the package; the bond strength between the peelable and skin layers being of such strength that the two layers may be manually separated one from the other, said bond strength being less than the seal strength between the skin layer and the support web;

(d) a header strip sealed to the upper surface of the support web adjacent an edge thereof;

(e) said composite film being superimposed over said strip but not adhered thereto, both the header strip and composite film terminating at the edge of the support member whereby the composite film is readily separable from the header strip at said edge thereby forming a manually grippable pull tab;



(f) a series of perforations in the composite film arranged substantially in a line generally parallel to the edge of the header which edge is nearest the product, each perforation extending through the composite film and said line being located immediately adjacent to said header;

(g) the resistance of the peelable layer to tearing along the line of perforations being greater than that of the skin layer whereby when the pull tab is gripped and lifted the peelable layer will not tear along said line but the skin layer will tear as it remains sealed to the support web while the peelable layer is peeled away.

4,889,732

METHOD FOR TREATING HAYS, GRAINS & SILAGES

Dee L. Cross, Central, S.C., assignor to Clemson University, Clemson, S.C.

Filed Sep. 22, 1988, Ser. No. 247,907
Int. Cl.[4] A23B *9/00*
U.S. Cl. 426—319 **15 Claims**

1. A method for treating organic farm material including one or more of hays, grains and silages, the method comprising the steps of:

(a) confining the organic farm material to a predetermined enclosure;

(b) introducing a solid chemical mixture into said enclosure;

(c) heating said solid chemical mixture to thereby release sufficient gaseous ammonia to said organic far material to accomplish at least one of the following: prevent spoilage, reduce toxin levels, and improve fermentation of said organic farm material; and wherein:

said solid chemical mixture includes ammonium carbamate, ammonium hydroxide, urea, and water.

4,889,733

METHOD FOR CONTROLLING PUFFING OF A SNACK FOOD PRODUCT

Miles J. Willard, 229 N. Lloyd Cir., Idaho Falls, Id. 83402; Kyle E. Dayley, Rte. 4, Box 4548, Rigby, Id. 83442; Veldon M. Hix, 1371 Fairmont Dr., and David A. Holm, Rte. 6, Box 263, both of Idaho Falls, Id. 83401

Continuation of Ser. No. 905,978, Sep. 10, 1986, abandoned, which is a division of Ser. No. 826,233, Feb. 5, 1986, Pat. No. 4,650,687, which is a continuation-in-part of Ser. No. 700,696, Feb. 12, 1985, abandoned. This application Dec. 8, 1988, Ser. No. 282,936

Int. Cl.[4] A23L *1/217*

U.S. Cl. 426—438 20 Claims

1. A method for controlling puffing of a starch-containing snack food product during cooking where the product is made from a dough piece formed as a thin sheet, comprising dockering the dough sheet with a brush formed of flexible bristles and then cooking the dockered dough sheet, the density of said bristles being from about 80 to about 200 bristles per square inch of brush surface, the flexible bristles being flexed while within the dough sheet to form oblated conical perforations in the dough sheet to allow for sufficient escape of steam during subsequent cooking and thereby avoid puffing in the cooked product.

4,889,734

METHOD FOR PREPARING QUICK-RECONSTITUTING FOODSTUFFS

Mounir A. Shatila, Blackfoot, Id., assignor to Basic American Foods, San Francisco, Calif.

Continuation of Ser. No. 555,009, Nov. 25, 1983, abandoned. This application May 13, 1986, Ser. No. 862,208

Int. Cl.[4] A23B *7/02*

U.S. Cl. 426—444 30 Claims

1. A method for producing a quick-reconstituting foodstuff comprising:

removing moisture from frozen foodstuff, from which substantially no moisture has been artificially removed, by subjecting said foodstuff to a forced stream of gaseous medium having a velocity within the range of 350 to 2,000 F.P.M. effective to fluidize said foodstuff and having a dry bulb temperature in the range of about 250° F. to 350° F. and a wet bulb temperature in the range of about 120° F. to 160° F. and then further dehydrating said foodstuff in an atmosphere having a dry bulb temperature of less than about 220° F. to produce a finish-dried foodstuff having a storage stable moisture content of less than about 12% by total weight and exhibiting a Rehydration Ratio representing the replacement of at least 90% of previously removed moisture after reconstitution for less than about 15 minutes in simmering water.

4,889,735

FURANIC ESTERS AND THEIR UTILIZATION AS FLAVOR INGREDIENTS

Wilhelm Pickenhagen, Chavannes-Des-Bois, Switzerland, and Alain Velluz, La Roche/Foron, France, assignors to Firmenich S.A., Geneva, Switzerland

Continuation of Ser. No. 919,168, Oct. 15, 1986, abandoned. This application Aug. 8, 1988, Ser. No. 229,791

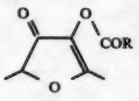
Claims priority, application Switzerland, Nov. 5, 1985, 4746/85

Int. Cl.[4] A23L *1/226, 1/235*

U.S. Cl. 426—536 5 Claims

1. Pure compounds of formula (I)

wherein R represents a linear or branched, saturated or unsaturated C_2–C_6 alkyl radical.



(I)

5. A foodstuff, a beverage, a pharmaceutical preparation or a tobacco product containing as active flavor ingredient a compound according to claim 1.

4,889,736

USE OF DIKETONE PRECURSORS IN FOOD PRODUCTS

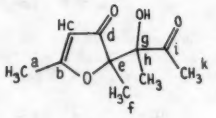
Tamme S. M. Doornbos, Krimpen a/d IJssel; Petrus Haring, Vlaardingen, and Arnoldus Van Der Heijden, 's-Gravenzande, all of Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Filed May 10, 1988, Ser. No. 192,733

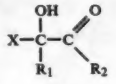
Claims priority, application Netherlands, May 14, 1987, 8701154

Int. Cl.[4] A23L *1/226*

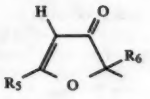
U.S. Cl. 426—536 11 Claims



1. A method for flavouring of food products comprising incorporating within said food products a precursor compound having the following structural formula:



in which X is



and in which R_1, R_2, R_5 and R_6 are different or identical and are selected from ethyl or methyl groups.

4,889,737

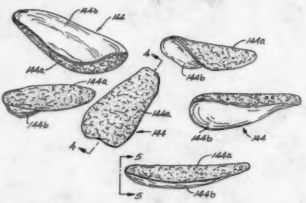
FRIED SNACK PRODUCT HAVING DOCKERING HOLES THEREIN

Miles J. Willard, 229 N. Lloyd Cir., Idaho Falls, Id. 83402; Kyle E. Dayley, Rte. 4, Box 4548, Rigby, Id. 83442; Veldon M. Hix, 1371 Fairmont Dr., and David A. Holm, Rte. 6, Box 263, both of Idaho Falls, Id. 83401

Continuation of Ser. No. 922,086, Oct. 20, 1986, abandoned, which is a division of Ser. No. 826,233, Feb. 5, 1986, Pat. No. 4,650,687, which is a continuation-in-part of Ser. No. 700,696, Feb. 12, 1985, abandoned. This application Jun. 20, 1988, Ser. No. 220,947

Int. Cl.[4] A23L *1/217*

U.S. Cl. 426—550 5 Claims



1. A fried snack product made from thin sheeted starch—containing fried dough pieces in which the fried pieces have from about 80 to 200 barely discernible dockering holes per square inch, each of said holes defining an inverted oblated conical aperture and arranged in a random pattern which varies uniquely from piece to piece and in which the fried pieces are essentially free of surface bubble formation.

4,889,738

AEROCHOCOLATES AND PROCESS FOR PREPARING THE SAME

Jun Hara, Tokyo, Japan, assignor to Morinaga & Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 943,408, Dec. 19, 1986, abandoned. This application Nov. 25, 1988, Ser. No. 275,613

Claims priority, application Japan, Dec. 20, 1985, 60-287222; Aug. 26, 1986, 61-199607

Int. Cl.[4] A23G *1/00*

U.S. Cl. 426—572 2 Claims

1. An aerochocolate which is a solid chocolate comprising numerous pores forming a continuous phase cavity structure, the aerochocolate having an apparent density of between 0.23 and 0.48 g/cm^3, the aerochocolate formed by a process comprising the steps of agitating, while cooling, a melted chocolate until its temperature becomes from 8° to 14° C. lower than the melting point of the fat contained in the chocolate and until its apparent density becomes between 0.7 and 1.1 g/cm^3, introducing into the chocolate a gas, followed by expansion of the gas under a reduced pressure of 150 Torr or lower, so that the discontinuous gas phase changes into a continuous gas phase, and a chocolate having an apparent density of between 0.23 and 0.48 g/cm^3, is produced.

2. A process for manufacturing aerochocolate having an apparent density of between 0.23 and 0.48 g/cm^3 and whose chocolate is a solid chocolate comprising numerous pores forming a continuous phase cavity structure, which processes comprises the steps of agitating, while cooling, a melted chocolate until its temperature becomes from 8° to 14° C. lower than the melting point of the fat contained in the chocolate and until its apparent density becomes between 0.7 and 1.1 g/cm^3, introducing into the chocolate a gas, followed by expansion of the gas under a reduced pressure of 150 Torr or lower, so that the discontinuous gas phase changes into a continuous gas phase, and a chocolate having an apparent density of between 0.23 and 0.48 g/cm^3, is produced.

4,889,739

METHOD FOR OBTAINING COMMERCIAL FEED JUICES HAVING A MORE HAND-SQUEEZED CHARACTER

John R. Powers, Fairfield; Gordon K. Stipp, West Chester; Rudolf G. K. Strobel, Cincinnati, and Chee-Hway Tsai, West Chester, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed May 18, 1987, Ser. No. 51,879

Int. Cl.[4] A23L *2/02*

U.S. Cl. 426—599 9 Claims

1. A method for obtaining a commercial feed juice from orange fruit, which comprises the steps of:

a. selecting processable orange fruit;

b. processing the selected fruit by:

(1) gently extracting juice from the selected fruit in a commercial juice extractor to provide extracted juice having about 0.015% or less titratable peel oil;

(2) gently and quickly removing non-juice materials from the extracted juice to provide a partially finished juice;

(3) removing sensible pulp from the partially finished juice to provide a completely finished juice substantially free of sensible pulp and having:

(a) a viscosity of at least about 10 centipoise at a temperature of 8° C.; and

(b) at least about 10% sinking pulp; and

(4) removing at least some of the sinking pulp from the completely finished juice to provide a commercial feed juice suitable for use in aroma/flavor volatile stripping and evaporative concentration processing, the feed juice having:

(a) a viscosity of from about 7 to about 10 centipoise at a temperature of 8° C.;

(b) from about 5 to about 10% sinking pulp;

(c) about 0.015% or less titratable peel oil;

(d) about 175 mg. or less, per 100 ml., of flavanoid glycosides

wherein the ratio of the combined amount of acetaldehyde, methanol, ethyl butyrate, ethyl 3-hydroxyhexanoate and valencene, to the combined amount of hexanal, alpha-pinene, myrcene, decanal, linalool and octanal in the feed juice is from about 8.5 to about 21.5.

4,889,740

POURABLE SHORTENING AND PROCESS FOR ITS PREPARATION

Judith E. Price, Yorba Linda, Calif., assignor to Beatrice/Hunt-Wesson, Inc., Fullerton, Calif.

Filed May 22, 1987, Ser. No. 53,403

Int. Cl.[4] A23D *5/00*

U.S. Cl. 426—606 36 Claims

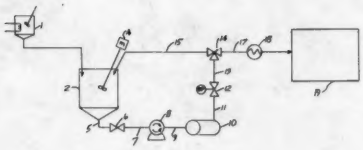
16. A process for preparing a pourable shortening having solid fatty glyceride particles suspended in a liquid glyceride oil without having melted substantially all of the solid fatty glyceride particles, said process comprising the steps of:

mixing solid fatty glyceride particles having a melting point

greater than about 100° F. in a liquid glyceride oil having an Iodine Value from about 90 to about 130 to form a first mixture, said solid particles capable of crystallizing in the beta phase;

wet grinding the solid particles while mixed in the liquid glyceride oil until at least 70% of said particles have a particle size less than about 10 microns, at least 80% of said particles have a particle size less than about 15 microns, and substantially all of the particles have a particle size less than about 30 microns;

increasing the temperature of the first mixture as the solid



fatty glyceride particles are wet ground such that the temperature of the first mixture does not exceed the melting point of said particles and at least about 30% of said particles remain in the solid phase; and

cooling said first mixture to ambient temperature to form a pourable shortening having from about 2 to about 18% by weight total solid particles with at least about 80% of said solid fatty glyceride particles having crystallized in the beta phase, said shortening having a viscosity from about 200 cps to about 25,000 cps and being pumpable at ambient temperature after storage over the temperature range from about 0° F. to about 100° F.

4,889,741

PROCESSED EGG PRODUCT

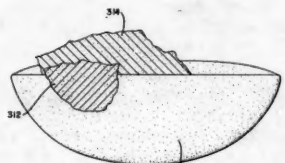
Michael B. Timmons, Ithaca, and Neal B. Kreher, Clarence, both of N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Division of Ser. No. 37,893, Apr. 13, 1987, Pat. No. 4,822,630. This application Aug. 5, 1988, Ser. No. 229,070

The portion of the term of this patent subsequent to Apr. 18, 2006, has been disclaimed.

Int. Cl.[4] A23L *1/32*

U.S. Cl. 426—614 **4 Claims**



1. A processed egg product made by a process which comprises the steps of:

(a) dispensing liquid egg white into a mold;

(b) dispensing a predetermined amount of filling comprising cooked particulate egg yolk having a irregular shape to float partially submerged in a substantially stationary position in said liquid egg white;

(c) cooking the egg white until solidified; thereby forming an egg product having a central yolk portion with its submerged portion surrounded by the cooked egg white portion with an irregularly shaped interface between the yolk portion and the egg white portion while the exposed upper yolk portion resembles a deviled egg filling.

4,889,742

LOBSTER-LIKE FOOD PRODUCT AND A PROCESS FOR PRODUCING THE SAME

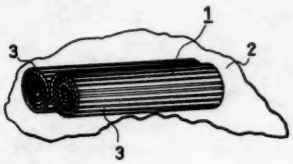
Yasuhiko Sasamoto; Shusaku Hasegawa, and Atsushi Okazaki, all of Tokyo, Japan, assignors to Taiyo Fishery Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 821,092, Jan. 21, 1986, abandoned. This application Dec. 10, 1987, Ser. No. 131,282

Claims priority, application Japan, Jan. 28, 1985, 60-10422; Feb. 1, 1985, 60-13146; Mar. 6, 1985, 60-31779; Mar. 6, 1985, 60-31781

Int. Cl.[4] A22C *25/00, 25/20*; A23L *1/325, 1/33*

U.S. Cl. 426—643 **4 Claims**



1. A lobster-like food product comprising:

two elongated imitation muscles arranged parallel to each other and extending over a substantial portion of the food product along the longitudinal direction thereof, each imitation muscle having a plurality of fibers arranged to extend in the same direction and bonded together to form a bundle of fibers, each imitation muscle being prepared by heat-coagulating a fish paste, at least partly cutting the heat-coagulated fish paste to form a plurality of attached fibers and assembling the fibers to form a bundle, and

an imitation outer shell having a shape imitating the outer shell of a lobster abdomen having plural segments, said outer shell enveloping said two imitation muscles to be embedded in the imitation outer shell parallel to each other so that their fiber directions are parallel to the longitudinal direction of the imitation outer shell, said outer shell being made from heat-coagulated ground fish and integrally bonded to the imitation muscles to thereby provide an appearance that the imitation muscles are embedded inside the outer shell,

wherein the food product having the imitation muscles and outer shell similar to the actual lobster tail is obtained.

4,889,743

METHOD FOR CONTINUOUS TARTAR SEPARATION

Toshiaki Tazawa, Osaka; Masahiro Yotsumoto, Kanagawa; Hiroshi Tanahashi, Osaka, and Yuzuru Wakabayashi, Hyogo, all of Japan, assignors to Suntory Limited, Osaka and Kansai Chemical engineering Co., Ltd., Amagasaki, both of, Japan

Division of Ser. No. 186,306, Apr. 26, 1988, Pat. No. 4,819,552. This application Jan. 19, 1989, Ser. No. 298,919

Claims priority, application Japan, Apr. 28, 1987, 62-105998

Int. Cl.[4] A23L *2/30*

U.S. Cl. 426—495 **3 Claims**

1. A method for continuously removing tartar from wine or grape juice by use of seed crystals, said method comprising the steps of:

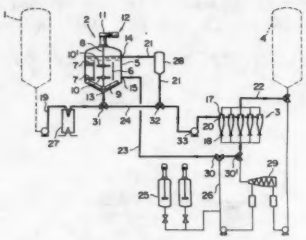
(a) placing a draft tube in a center portion of a crystallizer so as to define an annular zone between the inner periphery of the crystallizer and the outer periphery of the draft tube, said draft tube having a height of ⅓ to ¼ the total height of the crystallizer;

(b) producing a downward or upward flow inside the draft tube and an upward or downward flow in the annular zone, said flow in the annular zone being slower than said flow inside the draft tube;

(c) introducing a source liquid of wine or grape juice from

the bottom of the crystallizer into the crystallizer at a low temperature and adding a suspension containing tartar crystals to the crystallizer as seed crystals;

(d) circulating the source liquid with the downward flow and the upward flow along the draft tube with keeping the liquid at a low temperature, to crystallize tartar dissolved in the source liquid;



(e) overflowing the source liquid from an upper portion of the crystallizer and introducing the overflown liquid into a hydrocyclone;

(f) recovering an upward stream output of the hydrocyclone to obtain a product from which tartar crystals are removed; and

(g) returning an downward stream output of the hydrocyclone to the crystallizer.

4,889,744

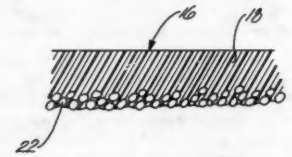
METHOD FOR MAKING OPEN-CELL, SILICONE-ELASTOMER MEDICAL IMPLANT

Joel Quaid, Santa Barbara, Calif., assignor to Medical Products Development Inc., Santa Barbara, Calif.

Division of Ser. No. 927,272, Nov. 4, 1986. This application May 2, 1988, Ser. No. 189,195

Int. Cl.[4] A01N *1/02*

U.S. Cl. 427—2 **16 Claims**



16. An improved method for making a silicone-elastomer shell for an integral mammary prosthesis, the improvement comprising the steps of:

dipping a supported mandrel into a silicone-elastomer dispersion to apply a final layer of silicone elastomer to a shell adhering to the mandrel;

allowing the final layer to stabilize after the mandrel is removed from the dispersion;

applying solid particles to the final layer;

volatilizing the final layer;

placing the mandrel and the shell into an oven maintained at an elevated temperature for a period of time;

dissolving the solid particles with a solvent that does not dissolve the silicone elastomer to any appreciable extent; and

evaporating any excess solvent remaining on the shell.

4,889,745

METHOD FOR REACTIVE PREPARATION OF A SHAPED BODY OF INORGANIC COMPOUND OF METAL

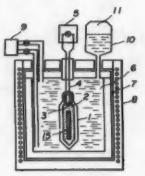
Nobuhiro Sata, Sendai, Japan, assignor to Japan as represented by Director General of Agency of Industrial Science and Technology, Tokyo, Japan

Filed Nov. 23, 1987, Ser. No. 123,953

Claims priority, application Japan, Nov. 28, 1986, 61-284879; Mar. 26, 1987, 62-72470

Int. Cl.[4] C04B *35/65*

U.S. Cl. 427—12 **12 Claims**



2. A method for coating a substrate plate with a coating layer of a refractory or other functional compound of a metal selected from the group consisting of carbides, borides, silicides, sulfides, nitrides and oxides of the metal which comprises the steps of:

(a) putting a substrate plate into a capsule made of a metal having a flat configuration;

(b) filling the space within the capsule with a powder mixture composed of a powder of a metal and a powder of an element or a compound of an element capable of exothermically reacting with the powder of the metal to form a carbide, boride, silicide, sulfide, nitride or oxide of the metal to form a layer of a powder compact of the powder mixture on the surface of the substrate plate;

(c) hermetically sealing the capsule;

(d) hydraulically compressing the capsule in a liquid compression medium communicating to an accumulator of a compressed gas; and

(e) igniting the layer of the powder compact at a periphery thereof to initiate the exothermic reaction of the powder mixture so that the reaction is propagated in the direction within the plane of the layer of the powder compact said capsule being formed with walls sufficiently thin so that the hydraulic pressure resulting from Step (C) can be fully transmitted to the ignited powder during the exothermic reaction, but of sufficient thickness to withstand the heat of reaction without melt down.

4,889,746

PROCESS FOR MANUFACTURING AN OPTICAL RECORDING MEDIUM

Kenichi Utsumi, Zama; Tetsuya Yuasa; Yasuyuki Goto, both of Atsugi; Iwao Tsugawa, Machida, and Nagaaki Koshino, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Apr. 18, 1988, Ser. No. 182,713

Claims priority, application Japan, Apr. 18, 1987, 62-094296

Int. Cl.[4] B05D *5/06*

U.S. Cl. 427—162 **25 Claims**

1. A process for manufacturing an optical recording medium including a recording layer of an alloy, said recording layer of an alloy being crystalline, said process comprising the steps of:

preparing a substrate; and

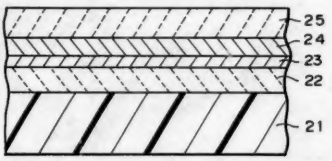
forming said recording layer by successively depositing a plurality of layers on the substrate while heating the substrate at a temperature lower than the thermal deformation temperature of the substrate, at least one of said successively deposited layers consisting essentially of an element composing said alloy or a chemical compound of

two or more elements composing said alloy, said successively deposited layers having an average chemical composition of said alloy of

$(In_{1-x}Sb_x)_{1-y}M_y$, $0.4 \leq x \leq 0.8$, $0 \leq y \leq 0.2$,

$(In_{1-x}As_x)_{1-y}M_y$, $0.2 \leq x \leq 1.0$, $0 \leq y \leq 0.2$,

$(In_{1-x}Bi_x)_{1-y}M$, $0.2 \leq x \leq 0.7$, $0 \leq y \leq 0.2$,



$(Ga_{1-x}Sb_x)_{1-y}M_y$, $0.4 \leq x \leq 0.9$, $0 \leq y \leq 0.2$,

$(Ga_{1-x}Bi_x)_{1-y}M_y$, $0.4 \leq x \leq 0.7$, $0 \leq y \leq 0.2$ or

$(Tl_{1-x}Bi_x)_{1-y}M_y$, $0.5 \leq x \leq 0.8$, $0 \leq y \leq 0.2$, and

wherein, M is one or more of the group consisting of Al, Si, P, S, Zn, Ga, Ge, As, Se, Ag, Cd, In, Sn, Sb, Te and Pb.

4,889,747

HYDROPHOBIC EXPANDED PERLITE COMPOSITIONS AND PROCESS FOR PREPARING THE SAME

Michael E. Wilson, Middleburg, Fla., assignor to PCR, Inc., Gainesville, Fla.

Continuation-in-part of Ser. No. 189,146, May 2, 1988. This application Mar. 1, 1989, Ser. No. 317,714

Int. Cl.[4] B05D *7/00*

U.S. Cl. 427—221 **54 Claims**

29. A process for increasing the resistance to penetration by aqueous media of expanded perlite, said process comprising

(a) applying on, in, or on and in from about 20 to about 99.9 parts by weight of expanded perlite, a buffered aqueous silane emulsion composition in an amount of from about 0.1 to about 80 parts by weight of said expanded perlite, comprising effective amounts of

(i) a hydrolyzable silane essentially hydrolytically stable within a determinable pH range;

(ii) an emulsifier or mixture of emulsifiers having an HLB value of from about 1.5 to about 20;

(iii) an effective amount of at least one compound for buffering the pH of said composition within said determinable pH stable range; and

(iv) water; and

(b) allowing said treated expanded perlite to cure.

4,889,748

DISPLAY DEVICE

Roger W. Dudley, 6647 Kerns Rd., Falls Church, Va. 22042

Filed Apr. 21, 1988, Ser. No. 184,376

Int. Cl.[4] A47G *33/08;* **G09F** *1/10*

U.S. Cl. 428—11 **17 Claims**

1. A combination comprising:

(a) rigid planar thin sheet substrate means,

(b) an envelope defined by sheets composed of transparent material and having an outer edge,

(c) a postage stamp disposed within the envelope between the pliable sheets,

(d) the envelope being sealed along its outer edge to confine the postage stamp while allowing a visual examination of the postage stamp through the envelope,

(e) the rigid planar thin sheet substrate means including first and second planar thin sheet substrate members each having a predetermined outer profile,

(f) fixing means securing the position of the envelope on the first rigid planar thin sheet substrate member,

(g) said first thin sheet substrate member being fixed to the second thin sheet substrate member which is larger than the first thin sheet substrate member, and

(h) a clear material disposed over the envelope to form a transparent dome-like structure through which the postage stamp may be viewed.

4,889,749

IDENTIFICATION CARD

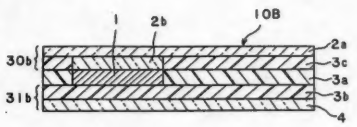
Masato Ohashi, Sanda City, and Shiyoojiro Kodai, Itami City, both of Japan, assignors to Ryoden Kasei Co., Ltd. and Mitsubishi Denki Kabushiki Kaisha, both of, Japan

Filed Nov. 24, 1987, Ser. No. 124,557

Claims priority, application Japan, Dec. 3, 1986, 61-288098

Int. Cl.[4] A47G *1/12*

U.S. Cl. 428—13 **8 Claims**



1. An identification card comprising:

a core layer having a thickness, opposed upper and back surfaces, and an opening extending through the thickness of the core layer;

a photograph disposed in the opening in said core layer, said photograph having a predetermined size and substantially the same thickness as said core;

a first assembly of multiple layers laminated on said upper surface of said core layer and said photograph, said first assembly being transparent opposite at least part of said photograph; and

a second assembly of multiple layers laminated on said back surface of said core layer and said photograph, said layers of said first and second assemblies having substantially similar thermal expansion properties and being substantially symmetrically arranged with respect to said photograph and said core layer.

4,889,750

CONDUCTIVE COATINGS AND FOAMS FOR ANTI-STATIC PROTECTION, ENERGY ABSORPTION, AND ELECTROMAGNETIC COMPATIBILITY

Robert E. Wiley, Port Huron, Mich., assignor to Acheson Industries, Inc., Port Huron, Mich.

Division of Ser. No. 757,029, Jul. 19, 1985, Pat. No. 4,818,437. This application Feb. 21, 1989, Ser. No. 312,657
Int. Cl.[4] B65D 73/02
U.S. Cl. 428—34.2 8 Claims

1. An improved container means for the shipping and storage of electronic components susceptible to damage from stray electrostatic discharge comprising a bottom, two opposing side walls, two opposing end walls, and a cover, wherein said container means has a continuous conductive coating, said coating covering substantially all of the interior surfaces of said bottom, said side walls, said end walls, and said cover, with said conductive coating comprising:

(a) about 5 percent to about 50 percent total elemental carbon by weight of the coating;

(b) about 2 percent to about 50 percent of a polymeric binder by weight of the coating;

(c) about 5 percent to about 93 percent of a solvent by weight of the coating; and

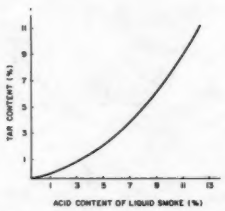
(d) optionally about 0 percent to about 5 percent of a surfactant by weight of the coating; wherein about 5 percent to about 95 percent of said total elemental carbon, by weight of the elemental carbon, is a ground coal-based, calcined coke, said coke demonstrating an E_C value of about 27 to about 80.

4,889,751

LIQUID SMOKE IMPREGNATED PEELABLE FIBROUS FOOD CASING ARTICLE

James R. Hansen, Tinley Park; Myron D. Nicholson, Lemont, and Jeffrey B. Sherry, Downers Grove, all of Ill., assignors to Viskase Corporation, Chicago, Ill.

Filed Nov. 9, 1987, Ser. No. 117,863
Int. Cl.[4] A22C 13/00
U.S. Cl. 428—34.8 15 Claims



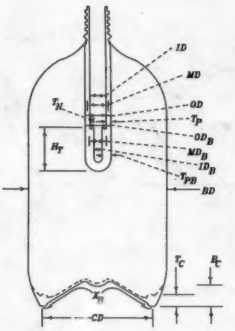
1. A fiber-reinforced cellulosic casing article having between about 40% and about 65% moisture content based on the dry cellulose weight, a first ketene dimer peeling aid coating on the casing inner surface with said ketene dimer having two alkyl groups of at least eight carbon atoms, a second wood-derived tar-containing liquid smoke coating superimposed on and impregnated into the first ketene dimer peeling aid coating in sufficient quantity to provide a casing absorptive index of at least about 0.4 at 340 nm wavelength, and said tar having a single mode mass spectrometric distribution below about 400 atomic mass units precipitated in the first and second coatings and within the casing wall, said tar-containing liquid smoke having a light transmittance at 590 nm of less than 50%.

4,889,752

ONE PIECE SELF-STANDING BLOW MOLDED PLASTIC CONTAINERS

Martin H. Beck, Merrimack, N.H., assignor to Devtech, Inc., Merrimack, N.H.

Continuation-in-part of Ser. No. 55,647, May 29, 1987, Pat. No. 4,780,257. This application Dec. 7, 1987, Ser. No. 129,642
Int. Cl.[4] B65D 1/00, 85/70
U.S. Cl. 428—36.92 47 Claims



1. A one-piece plastic container of the champagne base variety having a neck, sidewall and base having an annular peripheral chime surrounding an inward sloping base portion for resisting inversion of the base due to internal pressure when containing carbonated beverage:

(a) the inward sloping base portion being of thickness sufficient to resist self-deformation and create a moment arm thereof around the chime tending to unroll and radially stretch the chime; and

(b) the chime being of thickness sufficient to create an integrated reinforcing hoop to prevent unrolling and radial stretching of the chime which would allow inversion of the inward sloping base portion;

the container being made in a blow mold in a blow molding process using a stretch rod comprising

(c) producing a preform containing material for said neck, sidewall and base of the container; wherein the preform has an open neck to form the neck, a sidewall-forming portion of uniform thickness and a base-forming portion, the base-forming portion including an annular thickened portion shaped and positioned for engagement by a stretch rod,

(d) extending a stretch rod within the preform for longitudinally stretching the sidewall forming portion while minimizing stretching of the base forming portion, and

(e) injecting pressurized gas to blow the preform to produce the container.

4,889,753

PRESSURE SENSITIVE ADHESIVE RELEASE LINER AND FLUOROSILICONE COMPOUNDS, COMPOSITIONS AND METHOD THEREFOR

Paul L. Brown, Saginaw, and David L. Stickles, Midland, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 135,905, Dec. 21, 1987, Pat. No. 4,842,902, which is a division of Ser. No. 870,567, Jun. 4, 1986, Pat. No. 4,736,048. This application Mar. 13, 1989, Ser. No. 322,141
Int. Cl.[4] B32B 7/06
U.S. Cl. 428—40 11 Claims

1. Coated substract provided by a method comprising

(i) applying to the surface of said substrate a coating of a

coating composition comprising a curable mixture consisting essentially of

(A) a fluorosilicone polymer containing an average of at least two silicon-bonded curing radicals per molecule selected from the group consisting of hydrogen, hydroxyl and alkenyl and at least 2 mol percent, based on the total number of siloxane units in the fluorosilicone polymer, of fluorinated siloxane units, any remaining siloxane units in the polymer being non-fluorinated siloxane units; said fluorinated siloxane units having the formula

$$(RQ)(R')_a(Z)_bSiO_{(3-a-b)/2}$$

and said non-fluorinated siloxane units having the formula

$$(R')_c(Z)_dSiO_{(4-c-d)/2}$$

where, in said fluorinated and non-fluorinated siloxane units, R denotes a perfluoroalkyl radical having from 4 to 8 carbon atoms and, additionally, 2 to 3 carbon atoms when the fluorosilicone polymer contains less than 90 mol percent fluorinated siloxane units and 1 carbon atom when the fluorosilicone polymer contains from 7 to 10 mol percent fluorinated siloxane units, Q denotes a divalent hydrocarbon, hydrocarbon ether or hydrocarbon thioether radical linking the R radical to a silicon atom through at least 2 carbon atoms, R' denotes a silicon-bonded, monovalent hydrocarbon radical free of aliphatic unsaturation, Z denotes said silicon-bonded curing radical, a=0 to 2, b=0 to 2, a+b=0 to 2, c=0 to 3, d=0 to 3 and c+d=0 to 3 and,

(B) an effective amount of a curing agent for the fluorosilicone polymer and,

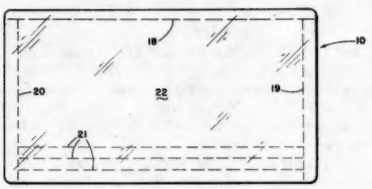
(ii) thereafter causing the applied curable mixture to cure.

4,889,754

TEMPORARY WINDOW

Ky Vargas, Broken Arrow, Okla., assignor to Temporary Windows, Inc., Tulsa, Okla.

Filed Sep. 12, 1988, Ser. No. 242,616
Int. Cl.[4] B32B 7/06, 7/12
U.S. Cl. 428—41 **10 Claims**



1. A temporary window comprising:

(a) a first layer of flexible transparent film cut to a preselected pattern corresponding to a shape adapted to cover and extend beyond the opening of a window;

(b) a thin film layer of transparent adhesive applied to one side of said first layer of flexible transparent film; and

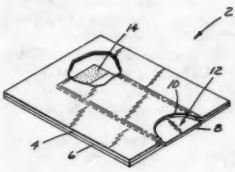
(c) a second layer of flexible transparent film cut to the same preselected pattern of said first layer of flexible transparent film, wherein said second layer of flexible transparent film is superimposed on said thin film layer of transparent adhesive applied to one side of said first layer of flexible transparent film thus forming a multilayer transparent composite and wherein at least one of said layers of flexible transparent film is precut along a plurality of preselected lines that form sections of said precut layer of flexible transparent film that can be peeled away thus exposing said adhesive such as to bond the temporary window in place during use.

4,889,755

FRAGRANCE RELEASING PULL-OUT SAMPLER

Jack W. Charbonneau, Somerset, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Nov. 1, 1988, Ser. No. 265,710
Int. Cl.[4] B32B 7/06, 7/12
U.S. Cl. 428—42 **20 Claims**



1. A sampling device for liquid materials comprising

(a) two sheets which form an enclosed area,

(b) a removable strip is present at least in part within said enclosed area,

(c) said strip has on at least some portion of at least one surface thereof microcapsules and a binder material, said microcapsules containing a liquid therein,

(d) said strip is adhesively secured to at least one sheet within said enclosed area.

4,889,756

SHEET-LIKE, MULTILAYER, LASER-OPTICAL RECORDING MATERIAL

Helmut Barzynski, Bad Duerkheim; Heidi Benthack-Thomas, Limburgerhof; Karl-Ruediger Hellwig, Moerstadt, and Christof Taubitz, Wachenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 12, 1988, Ser. No. 231,384
Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727093
Int. Cl.[4] B32B 3/02
U.S. Cl. 428—64 **28 Claims**

1. A sheet-like, multilayer, laser-optical recording material comprising

(a) a dimensionally stable, optically transparent and isotropic, homogeneous substrate and

(b) at least one amorphous, thermally alterable recording layer, wherein the substrate (a)

(a_1) has one or two structured surfaces, the structure being in the micrometer and/or submicrometer range, and is composed of a homogeneous blend of poly-(2,6-dimethylphenylene ether) (PPE) with one or more styrene polymers, the said blend being free of orientation birefringence and the content of PE in this blend being about 25–45% by weight, based on the blend, and

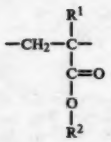
(a_2) that part of the blend which is not PPE contains, in the respective appropriate amounts based on this part (a_2), at least one of the following groups:

(a_{21}) from 0.1 to 8% by weight of cyanoethylene groups,

(a_{22}) from 1 to 60% by weight of 1-methyl-1-phenylethylene groups,

(a_{23}) from 1 to 60% by weight of 4'-methylphenylethylene groups, and

(a_{24}) from 0.01 to 10% by weight of groups of the formula I



I

(a_{25}) regardless of whether one or more of the groups (a_{21}) to (a_{24}) and moreover any additives are present in (a_2), the part (a_2) in any case contains at least 40% by weight of phenylethylene groups and that

(a_{26}) the groups (a_{21}), (a_{22}), (a_{23}) and/or (a_{24}) form the monomer units of one or more oligomeric or polymeric homopolymers or copolymers or of block or graft copolymers which have been separately prepared and then mixed with polystyrene.

4,889,757

OPTICAL RECORDING DISK

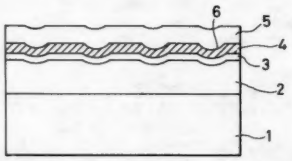
Shinkichi Horigome, Tachikawa; Toshio Nihara, Hachiouji; Norio Ohta, Sayama; Yutaka Sugita, Tokorozawa; Yoshinori Miyamura, Tokyo; Ryoichi Sudo, Yokosuka; Hiroaki Miwa, and Tetsuo Tajima, both of Fujisawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 19, 1987, Ser. No. 16,349

Claims priority, application Japan, Feb. 19, 1986, 61-32936

Int. Cl.[4] B32B *3/02*

U.S. Cl. 428—64 **34 Claims**



1. An optical recording disk comprising a transparent substrate; a layer of an ultraviolet-cured resin provided on a surface of said transparent substrate; and a recording film provided over said layer of ultraviolet-cured resin; wherein a material whose heat distortion temperature is not lower than about 65° C. is employed as the ultraviolet-cured resin.

4,889,758

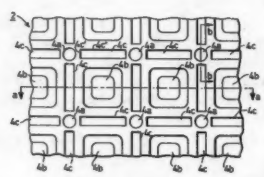
HIGH-STRENGTH PANEL STRUCTURE

Isaac Rinkewich, 48-22 Garden View Ter., Hightstown, N.J. 08520

Filed Mar. 29, 1988, Ser. No. 174,921

Int. Cl.[4] B32B *1/00*; **D01D** *5/20*; **B28B** *1/02*

U.S. Cl. 428—178 **19 Claims**



1. A panel having high strength relative to its weight, said panel being made of rigid material integrally moulded with a rectangular matrix of longitudinally and transversely-extending cells, each including side and face walls; said matrix of cells comprising a plurality of separate and distinct open cells, each open at one face of the panel, and a plurality of separate and distinct closed cells, each closed on all sides and having a face wall on the opposite face of the panel; each of said open cells being surrounded on all its sides by side walls of a plurality of said closed cells; each of said closed cells being surrounded on all its sides by side walls of a plurality of said open cells.

4,889,759

MASKING PAPER

Takashi Yamazaki, Tokyo, Japan, assignor to Johoku Industries Ltd., Tokyo, Japan

Continuation of Ser. No. 113,416, Oct. 27, 1987, abandoned, which is a continuation of Ser. No. 15,511, Feb. 13, 1987, abandoned, which is a continuation of Ser. No. 800,349, Nov. 21, 1985, abandoned. This application Jun. 1, 1988, Ser. No. 203,539

Int. Cl.[4] B32B *31/28*; **C09J** *7/02*

U.S. Cl. 428—181 **1 Claim**

1. A masking paper adapted to be dispensed from an apparatus for enclosing a roll of said masking paper, advancing a length of said masking paper to be dispensed and cutting said dispensed length, comprising:

a thin synthetic resin film folded at least once to form at least two equal length parallel pleats; and

a thick tape having a pressure sensitive adhesive layer formed on one side thereof and a silicon containing release coating on an other side thereof,

wherein a portion of said one side of said tape is adhered to an edge of said film which is parallel to the at least one fold, wherein said film is rolled into a roll such that another portion of said one side of said tape is rolled onto said other side of the tape of an adjacent turn of said roll, and wherein said silicon containing release coating coats all of said other side, whereby said masking paper may be easily dispensed from a dispensing apparatus enclosing a roll of said masking paper and advancing a length of said masking paper to be dispensed.

4,889,760

FILLER LAYER ELECTRICAL COMPONENT AND METHOD FOR THE MANUFACTURE THEREOF

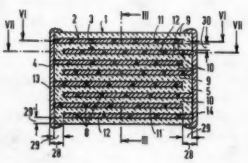
Horst Kippenberg, Herzogenaurach; Thomas Moser, Schnaittach, and Klaus Otto, Nuremberg, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 27, 1988, Ser. No. 224,755

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1987, 3725453

Int. Cl.[4] B32R *9/00*

U.S. Cl. 428—192 **28 Claims**



1. A filler layer electrical component, comprising:

a sintered monolistic ceramic body of dielectric material;

said ceramic body being provided with cavities to form ceramic layers in said body, said cavities being open to end faces of said body alternately from layer to layer, said cavities having openings to adjacent lateral faces of said body, said openings in said lateral faces of said body alternate in successive cavities to respective ones of said lateral faces, said openings have a length for each of said cavities in a range of 10 through 80% of an overall length of said lateral faces;

ceramic particles being distributed in said cavities to form supporting elements between said ceramic layers;

metal fillings being provided in said cavities and being of a material having the property of wetting surfaces of said ceramic layers in said cavities when said material is in a molten condition, said metal fillings substantially completely filling said cavities, said material of said metal fillings having a melting temperature considerably lower than a temperature required for sintering said ceramic body; and

contacts at said end faces of said body and extending onto said lateral faces, said contacts being electrically conductively connected to said metal fillings, said contacts being solderable, electrical contact of said contacts to said metal filling at said lateral faces being prevented by said limited openings.

4,889,761

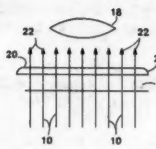
SUBSTRATES HAVING A LIGHT-TRANSMISSIVE PHASE CHANGE INK PRINTED THEREON AND METHODS FOR PRODUCING SAME

Donald R. Titterington, Tualatin; Jeffrey J. Anderson; James D. Rise, both of Portland, and Wayne Jaeger, Beaverton, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Aug. 25, 1988, Ser. No. 236,490

Int. Cl.[4] B32B *3/00*; G01D *9/00*

U.S. Cl. 428—195 **45 Claims**



1. A method for producing a phase change ink printed substrate, which comprises:

providing a substrate;

applying to at least one surface of said substrate a predetermined pattern of a light-transmissive phase change ink which transmits light in a non-rectilinear path; and

forming a layer of light-transmissive phase change ink printed on said substrate in which said pattern of solidified phase change ink has been reoriented and said ink layer has a substantially uniform thickness and transmits light in a substantially rectilinear path.

4,889,762

MOLDED ARTICLES OF THERMOPLASTIC ELASTOMER

Akira Uchiyama, Ichihara, and Katsuo Okamoto, Funabashi, both of Japan, assignors to Mitsui Petrochemical Industries Ltd., Tokyo and Tokushu Shikiryo Color & Chemical Inc., Chiba, both of, Japan

Filed Dec. 23, 1987, Ser. No. 137,054

Claims priority, application Japan, Dec. 26, 1986, 61-310649

Int. Cl.[4] B32B *27/14*; B29J *01/04*

U.S. Cl. 428—195 **10 Claims**

1. An article of thermoplastic elastomer comprising a molded article prepared from

a thermoplastic elastomer containing a partially cross-linked product of ethylene/α-olefin copolymer rubber;

a primer layer, formed on the surface of said molded article, said primer layer containing at least one compound selected from the group consisting of saturated polyesters and chlorinated polyolefin; and

a topcoat layer, formed on said primer layer, said topcoat layer containing at least one compound selected from the group consisting of saturated polyesters, acrylic ester resins, polyvinyl chloride and polyisocyanate, with the proviso that the topcoat layer contains at least the acrylic ester resin when the primer layer consists only of the saturated polyester.

4,889,763

SANDWICH MATERIAL AND THE USE THEREOF

Johan A. Brambach, Leiden, Netherlands, assignor to Schreiner Luchtvaartgroep B.V., Leiden, Netherlands

Continuation-in-part of Ser. No. 20,703, Mar. 2, 1987, Pat. No. 4,826,723, and a continuation-in-part of Ser. No. 110,793, Oct. 21, 1987. This application Oct. 20, 1988, Ser. No. 260,019

Claims priority, application European Pat. Off., Oct. 21, 1987, 87202024.3; Netherlands, Dec. 28, 1987, 8703138

Int. Cl.[4] B32B *3/26*

U.S. Cl. 428—246 **10 Claims**

1. Sandwich material comprising at least one layer of a thermoplastic polyetherimide or polyether sulfone foam and a fibre-reinforced layer comprising a fibrous mat impregnated with thermoplastic polyetherimide or polyether sulfone, applied to at least one surface of said foam.

6. A material as claimed in claim 1, wherein the fibrous mat is a woven fabric, a knitted fabric, a non-woven and/or unidirectionally oriented fibre structure.

4,889,764

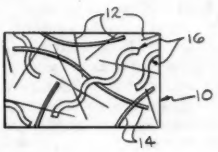
NON-WOVEN FIBROUS PRODUCT

Vaughn C. Chenoweth, Coldwater, and Roger C. Goodsell, Albion, both of Mich., assignors to Guardian Industries Corp., Northville, Mich.

Continuation-in-part of Ser. No. 322,642, Mar. 13, 1989, which is a continuation of Ser. No. 195,262, May 18, 1988, abandoned, which is a continuation-in-part of Ser. No. 53,406, May 22, 1987, Pat. No. 4,751,134. This application Apr. 27, 1989, Ser. No. 343,579

Int. Cl.[4] B32B *5/16*

U.S. Cl. 428—283 **20 Claims**



1. A non-woven fibrous product comprising, in combination,

a blended matrix of glass fibers and synthetic fibers, said synthetic fibers including homogeneous fibers selected from the group consisting of polyester, nylon, Nomex or Kevlar and bi-component fibers having a core of higher melting temperature polymer and a sheath of lower melting temperature polymer, and a thermosetting resin dispersed in said matrix.

4,889,765

INK-RECEPTIVE, WATER-BASED, COATINGS

John L. Wallace, Allentown, Pa., assignor to W. R. Grace & Co., Lexington, Mass.

Filed Dec. 22, 1987, Ser. No. 136,264
Int. Cl.[4] B05D *1/36, 7/00*; B32B *27/00*
U.S. Cl. 428—290 46 Claims

41. A coated article having aqueous ink applied to it prepared by a process comprising the steps of:

(a) providing a substrate;

(b) coating at least one surface of said substrate with a coating composition formed by:

(1) mixing an olefin copolymer containing pendant acid groups with a base capable of substantially neutralizing said acid groups and an aqueous liquid to form an aqueous solution; and

(2) mixing said aqueous solution with an aqueous solution of a 2-oxazoline polymer;

said coating composition comprising at least 5 weight percent 2-oxazoline polymer and at least 50 weight percent olefin copolymer containing pendant acid groups, said weight percents being based on the weight of the 2-oxazoline polymer and the olefin copolymer;

(c) drying said coating; and

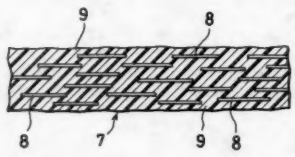
(d) applying an aqueous-based ink to the coated substrate.

4,889,766

PREPREG SHEET FOR FLAKE LINING AND LINING PROCESS USING THE SAME

Toshio Inuzuka; Tsutomu Hasegawa, both of Tsu; Minato Tomikawa, and Shigeru Aoki, both of Yokohama, all of Japan, assignors to Nippon Glass Fiber Co., Ltd., Tsu and Chiyoda Corporation, Yokohama, both of, Japan

Filed Jun. 17, 1988, Ser. No. 207,827
Claims priority, application Japan, Jun. 29, 1987, 62-159580
Int. Cl.[4] B32B *5/16, 19/00, 17/00*
U.S. Cl. 428—324 4 Claims



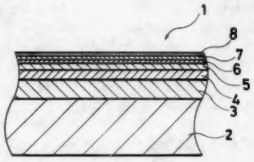
1. A prepreg sheet for flake lining, comprising a sheet made of a matrix resin containing a curing agent and a thickening agent and flakes dispersed in the matrix resin in a state nearly parallel to the surface of the sheet, said flakes being selected from the class consisting of glass flake, mica, metal flake and carbon flake, having a thickness of 0.5 to 10 μ, a diameter of 20 to 1000 μ, as determined on an assumption that the flakes are in the form of a circular plates, and an aspect ratio of 4 to 1000, and being dispersed in said matrix resin in an amount of 15 to 40% based on the total weight of the flakes and the matrix resin.

4,889,767

MAGNETIC RECORDING MEDIUM

Kenji Yokoyama; Masatoshi Nakayama; Toru Shimozawa; Kunihiro Ueda, and Fumio Maruta, all of Nagano, Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Apr. 23, 1987, Ser. No. 41,489
Claims priority, application Japan, Apr. 23, 1986, 61-093860; Jun. 27, 1986, 61-151174; Jun. 27, 1986, 61-151175
The portion of the term of this patent subsequent to Mar. 28, 2006, has been disclaimed.
Int. Cl.[4] G11B *5/64*
U.S. Cl. 428—336 39 Claims



1. In a magnetic recording medium comprising

a nonmagnetic substrate having opposed major surfaces,

a metal thin film magnetic layer on one major surface of the substrate,

a protective film of carbon on the magnetic layer, and

a topcoat layer 3–300 Å thick comprising an organic fluorine compound on the protective film,

the improvement wherein the surface of any underlying layer to which said protective carbon film is contiguous and optionally, the surface of said protective carbon film are plasma treated.

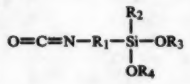
4,889,768

NOVEL SILICON-URETHANE (METH) ACRYLATE, AND RESIN COMPOSITION AND COATING MATERIAL COMPRISING SAME

Minoru Yokoshima, Toride, and Tetsuo Ohkubo, Ube, both of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 14, 1987, Ser. No. 38,154
Claims priority, application Japan, Apr. 24, 1986, 61-93265
Int. Cl.[4] B32B *9/00*
U.S. Cl. 428—429 14 Claims

1. A silicon-urethane (meth)acrylate which is a reaction product of an isocyanato-alkylsilane compound represented by the following general formula:



wherein R_1 represents an alkylene group having 2 to 5 carbon atoms, R_2 represents an alkyl group having 1 to 5 carbon atoms or alkoxy group having 1 to 5 carbon atoms, and R_3 and R_4 each represents an alkyl group having 1 to 5 carbon atoms, and a hydroxyl group-containing ester of (meth)acrylic acid.

4,889,769

METHOD OF PRODUCING MATTE PRECIOUS METAL DECORATIONS

Marion Lotze, Hammersbach, and Peter Kleinschmit, Hanau, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 31, 1987, Ser. No. 32,234

Claims priority, application Fed. Rep. of Germany, Apr. 4, 1986, 3611273

Int. Cl.[4] B32B *15/00, 17/06;* B05D *3/02*

U.S. Cl. 428—432 8 Claims

1. In a method for applying a bright precious metal preparation to a ceramic or porcelain carrier to produce a matte precious metal decoration which comprises applying a base layer to the ceramic or porcelain carrier, applying a layer comprising precious metal to the base layer, applying a glazing to the precious metal layer and firing the ceramic or porcelain carrier, the improvement wherein said base layer consists essentially of:

(a) 50 to 80% by weight of a mixture of

(aa) 30 to 80% by weight of lead-free borosilicate glazed frit with

(bb) 20 to 70% by weight of titanium dioxide powder and

(b) 20 to 50% by weight of a mixture of

(aa) 40 to 60% by weight of a modified alkyd resin with an oil content of 20 to 40% by weight and a solid content of 40 to 60% by weight with

(bb) 40 to 60% by weight of an aromatic hydrocarbon.

4,889,770

COMPOSITION FOR THE SURFACE TREATMENT OF RUBBER

Isao Ona, Chiba; Tsutomu Naganawa, Ichihara; Toshio Suzuki, Chiba, and Tadashi Okawa, Ichihara, all of Japan, assignors to Toray Silicone Company Limited, Tokyo, Japan

Filed Sep. 29, 1988, Ser. No. 251,616

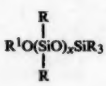
Claims priority, application Japan, Oct. 5, 1987, 62-251362

Int. Cl.[4] B32B *9/04*

U.S. Cl. 428—447 20 Claims

1. A composition comprising:

(A) 100 parts by weight of a diorganopolysiloxane having the general formula



wherein R is a monovalent hydrocarbon group, R^1 is selected from the group consisting of hydrogen and an alkyl group having 1 to 6 carbon atoms and x is an integer having a value of 1 to 1,000;

(B) from 0.1 to 30 parts by weight of at least one compound selected from the group consisting of organotrialkoxysilanes, organotriacyloxysilanes, organotrioximesilanes and tetraalkyl silicates; and

(C) from 0.1 to 20 parts by weight of a condensation-reaction catalyst selected from the group consisting of amine catalyst lacking organosilicon catalysts and organometallic catalysts.

4,889,771

METHOD OF PRESERVING WOOD WITH LANTHANIDE DERIVATIVES

Peter S. Gradeff, Pottersville, and John F. Davison, Edison, both of N.J., assignors to Rhone-Poulenc Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 17,159, Feb. 20, 1987, Pat. No. 4,743,473. This application Nov. 17, 1987, Ser. No. 121,623

Int. Cl.[4] B05D *1/18;* C09D *5/14*

U.S. Cl. 428—541 16 Claims

1. A method of preserving wood comprising the steps of

(a) contacting the wood with a composition comprising an aqueous solution of one or more lanthanide derivatives to impregnate wood with the lanthanide derivative;

(b) letting the wood-solution complex air-dry; and

(c) aging the wood-solution complex for a period of time sufficient to bond the lanthanide element to the wood.

14. A composition comprising wood or wood derivatives treated with effective amounts of lanthanides or lanthanide derivatives.

4,889,772

COMPOSITE MATERIAL HAVING A SLIDE LAYER APPLIED BY CATHODE SPUTTERING

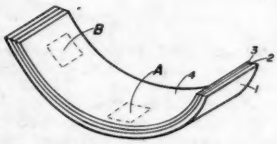
Erich Bergmann, Mels, Switzerland, and Jurgen Braus, Walldorf, Fed. Rep. of Germany, assignors to Balzers Aktiengesellschaft, Furstentum, Liechtenstein

Filed Dec. 22, 1987, Ser. No. 136,295

Claims priority, application Switzerland, Dec. 23, 1986, 05157/86

Int. Cl.[4] B22F *3/00*

U.S. Cl. 428—547 10 Claims



1. A composite material, comprising at least one cathode sputtering applied slide layer surface of a mixture of particles deposited in a substantially predetermined distribution of at least one cohesive metallic material forming a matrix, and at least one additional metallic material in the solid state, said additional metallic material having particles substantially locked in the matrix material, said locked particles having a diameter which changes at predetermined locations said predetermined locations extending parallel to the surface of the slide layer, said slide layer having a hardness which changes corresponding to the change of the diameter of particles at said predetermined locations thereby providing locations with particles of small mean particle diameter of high hardness and good load bearing ability and locations with particles of larger mean particle diameter with a lower degree of hardness corresponding to good embedding capacity.

4,889,773

RESISTANCE WELDING OF GALVANIZED STEEL

Donald H. Campbell, Niagara-on-the-Lake, Canada, and Gerald L. Evarts, Tonawanda, N.Y., assignors to Occidental Chemical Corporation, Dallas, Tex.

Division of Ser. No. 59,298, Jun. 8, 1987, Pat. No. 4,794,050. This application Nov. 7, 1988, Ser. No. 245,483

Int. Cl.[4] B22F *3/00*

U.S. Cl. 428—552 7 Claims

1. A resistance welding electrode having improved resistance welding characteristics, said electrode having a coating comprising a binder and a pigment, said pigment comprising at least one metal phosphide selected from the group consisting of iron, nickel, cobalt, tin, copper, titanium, manganese, molybdenum, tungsten, vanadium, tantalum, and mixtures thereof.

4,889,774

CARBON-FIBER-REINFORCED METALLIC MATERIAL AND METHOD OF PRODUCING THE SAME

Kazunori Fukizawa, Kiyose; Toyoko Ohshima, and Toshinobu Hata, both of Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 3, 1986, Ser. No. 870,050

Claims priority, application Japan, Jun. 3, 1985, 60-120163; Jul. 3, 1985, 60-146240

Int. Cl.[4] C22C *1/09*; B22D *19/14*

U.S. Cl. 428—614 5 Claims

1. A method for producing a carbon fiber-reinforced metallic material, comprising the steps of:

forming a fiber shaped article from a mixture of carbon fibers with a metal powder which is oxidizable to generate heat prior to oxidation of said carbon fiber;

preheating, in a non-oxidative atmosphere, said fiber shaped article;

exposing said preheated fiber shaped article to the ambient atmosphere, permitting said metal powder to be oxidized to generate heat; and

filling said fiber shaped article with a molten metal and solidifying the molten metal, wherein the oxidation of the metal powder generates heat and suppresses the oxidation of the carbon fibers.

4,889,775

HIGHLY CORROSION-RESISTANT SURFACE-TREATED STEEL PLATE

Takeshi Adaniya; Masaaki Yamashita; Takahiro Kubota; Akira Enatsu, all of Tokyo; Norio Nikaido, Hiratsuka; Yoshiaki Miyosawa, Hiratsuka, and Tadashi Nishimoto, Hiratsuka, all of Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo and Kansai Paint Co., Ltd., Amagasaki, both of, Japan

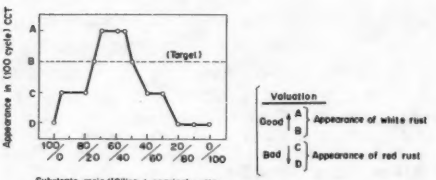
Filed Feb. 25, 1988, Ser. No. 160,030

Claims priority, application Japan, Mar. 3, 1987, 62-46872; Mar. 3, 1987, 62-46873

The portion of the term of this patent subsequent to Oct. 4, 2005, has been disclaimed.

Int. Cl.[4] B32B *15/04*

U.S. Cl. 428—62 B 63 Claims



1. A highly corrosion-resistant surface-treated steel plate comprising a zinc-deposited or zinc alloy-deposited steel plate, a chromate film formed on the steel plate and a film of a resin composition formed on the chromate film, said resin composition comprising a base resin obtained by adding at least one basic nitrogen atom and at least two primary hydroxyl groups to terminals of an epoxy resin, a polyisocyanate compound, the amount of said polyisocyanate compound being in the range of 5 to 80 parts per 100 parts resin, silica and sparingly water soluble Cr compound, the base resin/silica weight ratio being in the range of from 99/1 to 30/70 and the base resin/sparingly water soluble Cr compound weight ratio being in the range of from 99/1 to 60/40, and wherein weight ratio of the base resin/(silica+sparingly water soluble Cr compound) is 75/25 to 50/50, and the weight ratio of silica:sparingly water soluble Cr compound is 37/3 to 20/20.

4,889,776

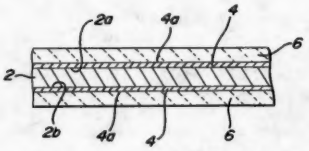
REFRACTORY METAL COMPOSITE COATED ARTICLE

Seymour Priceman, Seaford, N.Y., assignor to Barson Corporation, Troy, Mich.

Filed Aug. 17, 1987, Ser. No. 86,023

Int. Cl.[4] B32B *15/04*

U.S. Cl. 428—629 4 Claims



1. A coated article comprising a columbium substrate, an oxidation resistant intermetallic silicide layer fused in situ to the substrate and including by a reaction therewith an oxidation resistant columbium silicide compound, and a ceramic layer adhered to the intermetallic silicide layer and stable in high temperature oxidizing environments and at the interface with the silicide layer, said intermetallic silicide layer having a surface roughness of at least about 160 micro-inches RMS to promote adherence of the ceramic layer thereon.

4,889,777

SECONDARY BATTERY AND METHOD OF MANUFACTURING THE SAME

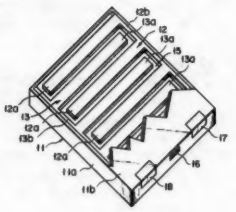
Keiji Akuto, Sayama, Japan, assignor to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

Filed Aug. 2, 1988, Ser. No. 227,370

Claims priority, application Japan, Aug. 7, 1987, 62-196415

Int. Cl.[4] H01M *6/12*, *4/02*

U.S. Cl. 429—162 24 Claims



1. A secondary battery comprising:

positive and negative electrode members arranged on a substantially identical plane, the positive and negative electrode members each having main surfaces and end faces, end faces of the positive and negative electrode members being spaced apart and opposing each other at distance;

a substrate fixedly contacting a main surface of the positive and negative electrode members and fixedly supporting the positive and negative electrode members;

a cover member defining, with the substrate, a sealed cham-

ber enclosing and covering the positive and negative electrode members; and

an electrolyte sealed in the sealed chamber, and the cover member being arranged relative to the electrode members such that the electrolyte is substantially present between the opposite end faces of the positive and negative electrode members, the electrolyte being associated with a battery reaction with the positive and negative electrode members, and wherein the electrolyte is present between the end faces of the positive and negative electrode members in an amount sufficient that the battery reaction substantially takes place at battery reaction sites defined between the opposite end faces of the positive and negative electrode members, said battery reaction sites extending substantially perpendicular to the direction of thickness of the positive and negative electrode members.

4,889,778

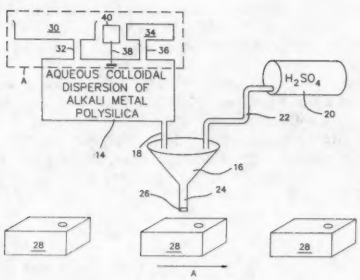
ALKALI METAL POLYSILICA GEL ELECTROLYTE LEAD-ACID BATTERY AND METHOD FOR MAKING THE SAME

Sudhan S. Misra, Lansdale, and Terrence M. Noveske, Pipersville, both of Pa., assignors to C & D Power Systems, Inc., Plymouth Meeting, Pa.

Division of Ser. No. 79,086, Jul. 29, 1987. This application Apr. 25, 1988, Ser. No. 185,501

Int. Cl.[4] H01M *10/10*

U.S. Cl. 429—190 **40 Claims**



29. A lead-acid battery comprising:

a. a battery case

b. positive and negative metal plates spaced one from another within said case; and

c. a thixotropic gel electrolyte within said case and providing electrolytic connection between said positive and negative plates, comprising

i. alkali metal polysilica;

ii. sulfuric acid; and

iii. water.

4,889,779

LITHIUM-SULFUR DIOXIDE ELECTROCHEMICAL CELL WITH AN IODINE-CATALYZED CATHODE

John F. Connolly, Glen Ellyn, and Robert J. Thrash, Carol Stream, both of Ill., assignors to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 776,599, Sep. 16, 1985, Pat. No. 4,612,265. This application Apr. 30, 1986, Ser. No. 857,306

Int. Cl.[4] H01M *6/14*

U.S. Cl. 429—196 **18 Claims**

1. An electrochemical cell comprising in combination:

(a) an anode which is comprised of lithium;

(b) a cathode; and

(c) a nonaqueous conductive electrolyte which comprises a solution of iodine and lithium iodide in sulfur dioxide, wherein the combined concentration of iodine and iodide ion in said electrolyte is at least about 0.2 normal and the lithium cation concentration in said electrolyte is at least about 0.2 normal.

4,889,780

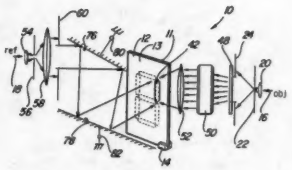
MULTIPLE EXPOSURE HOLOGRAM FOR MINIMIZING CROSSTALK

Lane W. Cosner, Hermosa Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 14, 1988, Ser. No. 168,114

Int. Cl.[4] G03H *1/04*; B60Q *1/00*

U.S. Cl. 430—1 **7 Claims**



1. A method of making a multiple exposure hologram so as to minimize crosstalk during playback, said method comprising:

(a) illuminating a first and second area of a photosensitive plate from one side thereof at a given angle with an object beam, wherein said object beam is directed towards said photosensitive plate through a first opaque mask with plurality of cut outs therein, each cut out generally corresponding to the desired shape of the first and second holographic images;

(b) illuminating said first area of the plate at a first angle from an opposite side thereof with a reference beam to thereby create a first holographic image in one segment of the plate;

(c) illuminating said second area of the plate at a second angle from an opposite side thereof with said reference beam to thereby create a second holographic image in another segment of the plate;

(d) developing the photosensitive plate to form a hologram with multiple holographic images therein on different segments thereof;

wherein steps (b) and (c) include directing said reference beam towards the opposite surface of the plate through a second opaque mask with a plurality of cut outs therein generally corresponding to the first and second areas of the plate; and

wherein said first and second holographic images can be played back by selectively illuminating the plate with playback by selectively illuminating the plate with playback beams striking the plate at angles associated with the first and second angles of the reference beam during steps (b) and (c) thereby substantially eliminating crosstalk during playback.

5. A method of making a hologram in the form of a seven-segment alphanumeric display, said method comprising:

exposing a photosensitive plate in a multiple number of steps, each step using cut outs in masks for an object and reference beam to selectively illuminate only certain segments of the plate while preventing light from striking other areas of the plate, the object beam striking the plate from one side thereof at the same angle during each exposure step while the reference beam strikes the plate from the other side thereof at different angles during each exposure step.

4,889,781

PROCESS AND APPARATUS FOR PRODUCING A BLACK MATRIX LAYER

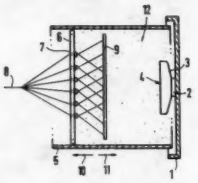
Volker Gerstle, Lorch, and Gerhard Mauz, Kongen, both of Fed. Rep. of Germany, assignors to Nokia Graetz, Pforzheim, Fed. Rep. of Germany

Continuation of Ser. No. 913,118, Sep. 29, 1986, abandoned. This application May 19, 1988, Ser. No. 196,855

Claims priority, application Fed. Rep. of Germany, Sep. 27, 1985, 3534414

Int. Cl.[4] G03C 5/24

U.S. Cl. 430—25 7 Claims



1. A process for producing a black-matrix layer between phosphor areas on an inside surface of a faceplate of a color picture tube, comprising the steps of:

coating the inside surface of the faceplate with a photoresist;

exposing certain portions of this photoresist coating to light;

developing the light-exposed portions by subjecting the photoresist coating to water only in the form of water vapor having a relative humidity of about 80–100 percent and a temperature of about 30°–50° C.;

removing the unexposed portions of the photoresist coating;

providing the entire inside surface of the faceplate with a black-matrix layer formed from a graphite suspension; and

removing those portions of the black-matrix layer where the phosphor areas are to be formed, whereby the simultaneous presence of the high humidity over the surface of the photoresist coating during development insures a uniform development of all exposed areas of the photoresist coating.

4,889,782

ELECTROSTATIC PHOTOCOPYING MACHINE

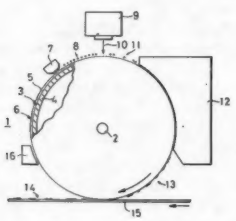
Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Division of Ser. No. 116,337, Nov. 2, 1987. This application Apr. 10, 1989, Ser. No. 335,708

Claims priority, application Japan, Jun. 25, 1980, 55-86801

Int. Cl.[4] G03G 15/22

U.S. Cl. 430—57 6 Claims



1. An electrostatic photocopying machine comprising:

a printing member including

a conductive substrate;

a non-single-crystal p-type semiconductor layer formed on said conductive substrate;

a non-single-crystal intrinsic semiconductor layer formed on said p-type semiconductor layer in order to induce a built-in electric field across the interface therebetween;

an insulating layer formed on said intrinsic layer with an external surface to permit the passage of charge photogenerated in said intrinsic layer so that charge on the external surface can be neutralized;

where the band gaps of the p-type layer and the intrinsic layer are substantially less than the bend gap of the insulating layer; and

where said p-type layer, said instrinsic layer, and said insulating layer are selected from the group consisting of silicon, silicon with nitrogen, silicon with carbon and silicon with oxygen either in stoichiometric or non-stoichiometric amounts;

means for providing said charge on said external surface of the insulating layer of the printing member;

means for projecting a light image onto said external surface of said insulating layer to thus form an electrostatic charge image; and

means for developing the electrostatic charge image to form a visible image pattern on the insulating layer of the printing member.

4,889,783

PRINTING MEMBER FOR ELECTROSTATIC PHOTOCOPYING

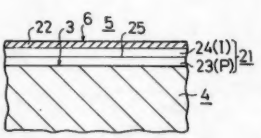
Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Division of Ser. No. 814,083, Dec. 24, 1985, abandoned, which is a continuation of Ser. No. 502,583, Jul. 21, 1983, abandoned, which is a division of Ser. No. 276,503, Jun. 23, 1981, Pat. No. 4,418,132. This application Nov. 2, 1987, Ser. No. 116,337

Claims priority, application Japan, Jun. 25, 1980, 55-86801

Int. Cl.[4] G03G 5/082, 5/14

U.S. Cl. 430—57 5 Claims



1. A printing drum for electrostatic photocopying machine comprising:

a conductive substrate;

a non-single-crystal p-type semiconductor layer formed on said conductive substrate;

a non-single-crystal intrinsic semiconductor layer formed on said p-type semiconductor layer in order to induce a built-in electric field across the interface therebetween; and

an insulating layer formed on said intrinsic layer with an external surface to permit the passage of charge photogenerated in said intrinsic layer so that charge on the external surface can be neutralized;

where the band gaps of the p-type layer and the intrinsic layer are equal or the band gap of the p-type layer is less than the band gap of the i-type layer which in turn is substantially less than the band gap of the insulating layer;

where said p-type layer, said intrinsic layer, and said insulating layer are selected from the group consisting of silicon, silicon with nitrogen, silicon with carbon and silicon with oxygen either in stoichiometric or non-stoichiometric amounts.

4,889,784

ORGANIC PHOTOCONDUCTORS WITH IMPROVED WEAR

Robert B. Champ, Boulder, Colo.; Meredith D. Shattuck, Hollister, Calif., and Donald A. Stremel, No. Glen, Colo., assignors to International Business Machines, Armonk, N.Y.

Filed Oct. 25, 1988, Ser. No. 262,397
Int. Cl.[4] G03G 5/04
U.S. Cl. 430—58 4 Claims

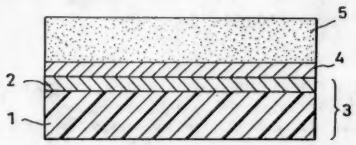
1. An organic photoconductor comprising a charge generation layer and on top thereof a charge transport layer in which the total concentration of the charge transport material is from 80% to 30% in that portion which is nearer the charge generation layer and is at least 30% less in that portion which is farther away from the charge generation layer.

4,889,785

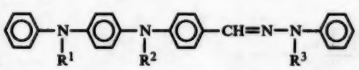
ELECTROPHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Tomokazu Kobata, and Yosuke Matsui, both of Kobe, Japan, assignors to Bando Chemical Industries, Ltd., Kobe, Japan

Filed Dec. 12, 1988, Ser. No. 282,668
Claims priority, application Japan, Dec. 10, 1987, 62-313805; Oct. 7, 1988, 63-254225
Int. Cl.[4] G03G 5/14
U.S. Cl. 430—59 2 Claims



1. In an electrophotographic light-sensitive material having a layer of a charge transporting substance and a layer of a charge producing substance on an electrically conductive support, the improvement wherein said charge transporting substance is an arylaldehydehydrazone derivative of the general formula:



where R^1, R^2 and R^3 are each an alkyl or aryl group.

4,889,786

LIGHT-SENSITIVE MATERIAL CONTAINING SILVER HALIDE, REDUCING AGENT POLYMERIZABLE COMPOUND AND COLOR FORMING SYSTEM AND COMPRISING MICROCAPSULES HAVING DIFFERENT MEAN GRAIN SIZES

Ryuichi Takahashi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 20, 1988, Ser. No. 183,955
Claims priority, application Japan, Apr. 20, 1987, 62-96802
Int. Cl.[4] G03C 1/72; B41M 5/12
U.S. Cl. 430—138 12 Claims

1. A light-sensitive material comprising a light-sensitive layer containing a silver halide grain, an ethylenically unsaturated polymerizable compound or a polymerizable compound which polymerizes by ring opening, a reducing agent, two components which give a color in contact with each other and a support, wherein one of the components, the silver halide and the polymerizable compound are contained together in a microcapsule to form a light-sensitive microcapsule and the other component is contained in other microcapsule, and a mean particle size of the microcapsule containing the other component is larger than that of the light-sensitive microcapsule.

4,889,787

LOW GAIN POSITIVE ACTING DIAZO OXIDE PRE-PRESS PROOFING SYSTEM WITH POLYVINYL ETHER AND PARTICULATE SLIP AGENT IN ADHESIVE LAYER

Arlene K. Musser, Oakdale, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 25, 1988, Ser. No. 185,971
Int. Cl.[4] G03C 1/60, /190
U.S. Cl. 430—166 8 Claims

1. A positive acting photosensitive proofing element comprising:

(A) a strippable carrier,

(B) a positive acting photosensitive layer comprising a base soluble organic polymeric resin binder having a positive-acting diazo oxide mixed with, dissolved in, or pendant to said binder, said layer containing sufficient colorant therein to provide a reflection optical density of at least 0.8 and

(C) a thermoplastic thermal adhesive layer, said adhesive layer being present at a weight of between 1.0 g/m^2 and 3.2 g/m^2 having a Tg between 45 and 60° C., and said adhesive layer comprising by weight of solids:

(a) an acrylic copolymer with styrene,

(b) 0.05 to 1.0% particulate slip agents,

(c) at least 4% by weight of said styrene copolymer units, and

(d) at least 2–35% by weight of a polyvinyl ether polymer flexibilizer.

4,889,788

PHOTOSENSITIVE COMPOSITION, PHOTOSENSITIVE COPYING MATERIAL PREPARED FROM THIS COMPOSITION WITH THERMAL HARDENING SYMMETRIC TRIAZINE ALKYL(ARYL)-ETHER

Paul Stahlhofen, and Hans W. Frass, both of Wiesbaden, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

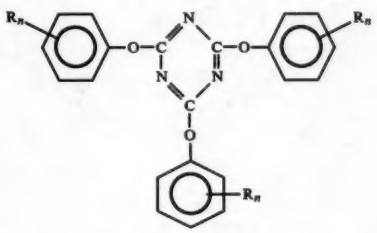
Filed Jul. 27, 1988, Ser. No. 224,725
Claims priority, application Fed. Rep. of Germany, Aug. 5, 1987, 3725949
Int. Cl.[4] G03C 1/60, 1/495
U.S. Cl. 430—191 5 Claims

1. A photosensitive composition comprising in admixture:

a polymeric binder which is insoluble in water and soluble in aqueous-alkaline solutions present in an amount sufficient to form a uniform film;

one of a photosensitive 1,2-quinonediazide and a photosensitive mixture comprising a compound which splits off acid upon exposure to light and a compound containing at least one acid-cleavable C-O-C group; and

a symmetric triazone-alkyl(aryl)-ether as a substance which promotes thermal hardening comprising a compound of the general formula I



wherein
R denotes alkyl, allyl, alkoxy, alkoxycarbonyl, alkoxycarbonylalkenyl, each having from 1 to 4 carbon atoms in the alkyl or alkenyl group, aryloxy, halogen or a nitro group and n is 1 to 3.
wherein the photosensitive compound or mixture is present in an amount sufficient to render exposed areas soluble in developer and the thermal-hardening substance is present in an amount sufficient to cause hardening of exposed areas under the action of heat.

4,889,789

PHOTOSENSITIVE COMPOSITION AND PHOTOSENSITIVE COPYING MATERIAL PREPARED THEREFROM WHEREIN COMPOSITION HAS A THERMAL CROSSLINKING URETHANE FORMALDEHYDE CONDENSATE

Paul Stahlhofen, Wiesbaden, Fed. Rep. of Germany, assignor to Hoechst Aktiengsellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Apr. 4, 1988, Ser. No. 177,414
Claims priority, application Fed. Rep. of Germany, Apr. 3, 1987, 3711264
Int. Cl.[4] G03C *1/60, 1/495*
U.S. Cl. 430—191 **6 Claims**

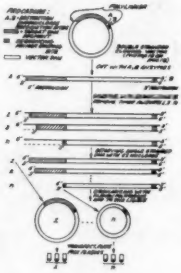
1. A photosensitive composition comprising in admixture:
a polymeric binder which is insoluble in water and soluble in aqueous-alkaline solutions present in an amount sufficient to form a uniform film;
a photosensitive 1,2-quinonediazide or a photosensitive mixture comprising a compound which splits off acid upon exposure to light and a compound containing at least one acid-cleavable C-O-C group; and
a thermally crosslinking compound, wherein the thermally crosslinking compound comprises a condensation product according to the general formula t,0200
wherein R represents hydrogen or an alkyl group and wherein the photosensitive compound or mixture is present in an amount sufficient to render exposed soluble in developer and the condensation product is present in an amount sufficient to cause hardening of exposes areas under the action of heat.

4,889,790

METHOD OF FORMING A CONFORMABLE MASK ON A PRINTED CIRCUIT BOARD

Leo Roos, Laguna Beach, Calif.; Fredrick J. Axon, Worsley, England, and James J. Briguglio, Newport Beach, Calif., assignors to Morton Thiokol, Inc., Chicago, Ill.

Filed Feb. 26, 1988, Ser. No. 160,895
Int. Cl.[4] G03C *11/12*
U.S. Cl. 439—258 **16 Claims**



1. A method of forming a solder mask on the surface of a printed circuit board having a non-conductive surface and circuitry traces elevated therefrom, the method comprising
(A) providing a dry film comprising
(1) a cover sheet,
(2) a top coat on said cover sheet, and
(3) a layer of photoimageable composition on said top coat, which photoimageable composition is curable after exposure and development to provide a hard, permanent solder mask overlying the printed circuit board, said top coat being selectively adherent to said photoimageable composition relative to its adherence to said cover sheet;
(B) tacking said photoimageable composition layer to the surface of said printed circuit board;
(C) removing said cover sheet from said top coat, leaving said photoimageable composition layer tacked to the surface of said circuit board with said top coat covering and protecting the same;
(D) laminating said photoimageable composition layer to the surface of said printed circuit board, using heat and vacuum to conform said photoimageable composition layer and said top coat to the surface thereof;
(E) exposing said photoimageable composition layer to patterned actinic radiation;
(F) developing said photoimageable composition to remove either exposed or unexposed portions from said printed circuit board, leaving either unexposed or exposed portions remaining on said printed circuit board; and
(G) curing said remaining portions of said photoimageable composition layer to form a hard, permanent solder mask protecting said printed circuit board.

4,889,791

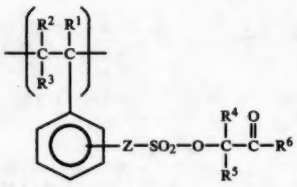
POSITIVE TYPE PHOTORESIST MATERIAL

Shozo Tsuchiya, Tokyo; Nobuo Aoki, and Shinichiro Suzuki, both of Yokohama, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Filed Jan. 31, 1989, Ser. No. 304,790
Claims priority, application Japan, Feb. 6, 1988, 63-24919
Int. Cl.[4] G03C *5/16, 1/495*
U.S. Cl. 430—270 **11 Claims**

1. A positive type photoresist material comprising a polymer having structural units each represented by the following formula (I) of;

(I)



wherein each of R^1, R^2, R^3 and R^6 represents a hydrogen atom or a hydrocarbon residue having 1 to 12 carbon atoms, each of R^4 and R^5 represents a hydrogen atom, a hydroxyl group or a hydrocarbon residue having 1 to 12 carbon atoms and Z represents $—CH_2)_n$ in which n indicates an integer of 0 to 4.

4,889,792

TERNARY PHOTOINITIATOR SYSTEM FOR ADDITION POLYMERIZATION

Michael C. Palazzotto, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 9, 1987, Ser. No. 130,606
The portion of the term of this patent subsequent to Apr. 5, 2005, has been disclaimed.
Int. Cl.[4] G03C *1/72, 1/50*
U.S. Cl. 430—281 **17 Claims**

1. A photopolymerizable composition comprising:

(a) at least one vinyl monomer capable of undergoing free-radical polymerization, and

(b) a photoinitiator system comprising photochemically effective amounts of

(i) a diaryliodonium salt,

(ii) an organic or inorganic pigment, insoluble in the photopolymerizable composition, which serves as a sensitizer, and

(iii) at least one electron donor compound, said donor being different from said pigment and having a potential between about 0.5 and 1.5 volts versus a saturated calomel electrode.

4,889,793

PHOTOSENSITIVE POLYMER COMPOSITION CONTAINING AN ETHYLENICALLY UNSATURATED COMPOUND AND A POLYAMIDE OR POLYESTERAMIDE

Masaharu Taniguchi, Shiga; Masazumi Tokunow, and Junichi Fujikawa, both of Kyoto, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Oct. 5, 1987, Ser. No. 104,208

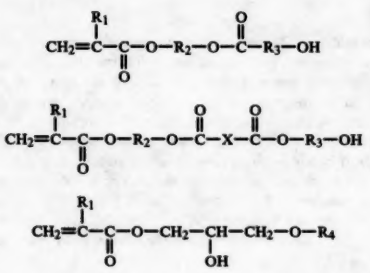
Claims priority, application Japan, Dec. 26, 1986, 61-308687; May 20, 1987, 62-121333

Int. Cl.[4] G03C *1/70, 1/68*

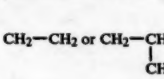
U.S. Cl. 430—284 **32 Claims**

1. A photosensitive polymer composition comprising the following components A, B and C:

A. 100 parts by weight of ethylenically unsaturated compounds, wherein at least 50 wt. % of the ethylenically unsaturated compounds is one having the following general formulae:



wherein R_1 represents H or CH_3, R_2 represents



R_3 represents an alkylene group having 2 to 6 carbon atoms, R_4 represents an alkyl group having 4 to 14 carbon atoms or a phenyl group unsubstituted or substituted with an alkyl group having 1 to 8 carbon atoms, and X represents a dicarboxylic acid residue having 4 to 12 carbon atoms;

B. 3 to 30 parts by weight of a polyamide soluble in the ethylenically unsaturated compounds; and

C. 0.01 to 10 parts by weight of a photopolymerization initiator.

2. A photosensitive polymer composition according to claim 1, wherein at least a part of the ethylenically unsaturated compounds is an oligomer urethane acrylate or methacrylate.

4,889,794

METHOD OF CHANGING THE DENSITY OF IMAGE ON SIMPLE COLOR PROOF USING A RANDOMLY DOTTED HALF TONE MASK

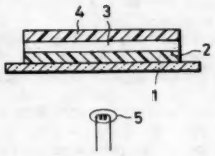
Masahiro Terahata, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 884,340, Jul. 11, 1986, abandoned. This application Jul. 1, 1988, Ser. No. 214,063

Claims priority, application Japan, Jul. 12, 1985, 60-152506

Int. Cl.[4] G03C *5/00*

U.S. Cl. 430—293 **13 Claims**



1. A method of obtaining a color proof, comprising the steps of:

(A) exposing a plurality of light-sensitive layers which are provided on respective bases, to respective color-separated images of a color image, wherein said light-sensitive layers comprise:

(i) a photolytic polymer as a light-sensitive material,

(ii) a colorant, and

(iii) a binder, and wherein each of said light-sensitive layers contains a different colorant which produces a color selected from the group consisting of yellow, magenta, cyan and black;

(B) developing said light-sensitive layers; and

(C) transferring said developed light-sensitive layers successively in registration onto an image-receiving material comprising an image-receiving layer provided on a base; and

(D) transferring the resulting image-receiving layer of step (C) to a printing paper to obtain a color proof; wherein said exposing includes exposing at least one of said light-sensitive layers through a randomly dotted half-tone mask having dots of a first transmissivity on a background of a second transmissivity, wherein said dots are randomly at a density on the randomly dotted half-tone mask in the range of $10–10^4$ per cm^2 and have diameters in the range of 5–300 micrometers, wherein said color-separated images are positive color separated film and said first transmissivity of said dots is greater than said second transmissivity of said background, and wherein said exposing step includes a first exposing step of exposing said light-sensitive layers to said respective color-separated images without passing said respective color-separated images through a randomly dotted half-tone mask and a second exposing step of exposing said light-sensitive layers to uniform illumination projected through said randomly dotted half-tone mask.

4,889,795

PROCESS FOR FORMING PHOTORESIST PATTERN USING CONTRAST ENHANCEMENT LAYER WITH ABIETIC ACID

Katsuaki Kaifu; Maki Kosuge; Yoshio Yamashita; takateru Asano, and Kenji Kobayashi, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd. and Fuji Chemicals Industrial Co., Ltd., both of Tokyo, Japan

Filed Feb. 23, 1988, Ser. No. 159,292

Claims priority, application Japan, Feb. 23, 1987, 62-37845; Mar. 4, 1987, 62-47806

Int. Cl.[4] G03F 7/26

U.S. Cl. 430—326 16 Claims

1. A process for forming a photoresist pattern which consisting essentially of the steps of

coating an underlying layer with a photoresist to form a photoresist layer on said underlying layer,

coating the upper surface of the resulting photoresist layer with a contrast enhancement film formed from a solution of the material thereof in a nonpolar solvent to form a contrast enhancement layer,

exposing a portion of the resulting structure pattern wise through a photomask to a light to which both of said photoresist and said contrast enhancement layer are light-sensitive, and

developing said photoresist layer to form a photoresist pattern by an aqueous alkaline solution to remove the exposed portions of the photoresist, while simultaneously dissolving and removing said contrast layer, thereby leaving the unexposed portions of the photoresist on the underlying layer; and wherein

the material of said contrast enhancement layer comprising effective amounts of a photobleachable dye selected from the group consisting of a diazonium salt, a diazocarbonyl compound and a nitrone compound, and compounds of more than two materials selected from the group consisting of nitrone, diazonium salt and diazocarbonyl, effective amounts of a binder selected from the group consisting of abietic acid and a rosin which contains abietic acid as the main component, which binder is soluble in both an aqueous alkaline solution and a nonpolar organic solvent and which binder is present in sufficient amounts to bind the photobleachable dye, said photobleachable dye being present in a sufficient quantity amount to improve the contrast in the photoresist layer.

4,889,796

SILVER HALIDE PHOTOGRAPHIC EMULSION

Akihiko Ikegawa; Yuichi Ohashi, and Masaki Okazaki, all of Minami-Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

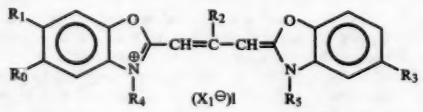
Filed Dec. 23, 1987, Ser. No. 136,991

Claims priority, application Japan, Dec. 27, 1986, 61-314596

Int. Cl.[4] G03C 1/19, 1/28

U.S. Cl. 430—549 17 Claims

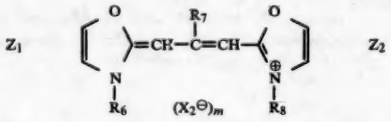
1. A silver halide photographic emulsion which contains at least one of the compounds represented by the following general formula (I), and at least one compound selected from the group consisting of the compounds represented by the general formula (II) and the compounds represented by the general formula (III): General formula (I)



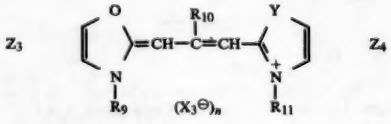
wherein R_0 and R_1 may be the same or different, and represent hydrogen atoms, unsubstituted or substituted alkyl groups, unsubstituted or substituted aryl groups, unsubstituted or substituted aryloxy groups, halogen atoms, unsubstituted or substituted alkoxycarbonyl groups, unsubstituted or substituted acylamino groups, unsubstituted or substituted acyl groups, cyano groups, unsubstituted or substituted carbamoyl groups, unsubstituted or substituted sulfamoyl groups, carboxyl groups or unsubstituted or substituted acyloxy groups under the condition that R_0 and R_1 do not represent hydrogen atoms at the same time; R_2 represents a hydrogen atom, an unsubstituted or substituted alkyl group, or an unsubstituted or substituted aryl group; R_3 represents an unsubstituted or substituted alkyl group having 2 or more carbon atoms, an unsubstituted or substituted aryl group, an unsubstituted or substituted aryloxy group, an acyl group having 3 or more carbon atoms, an acyloxy group having 3 or more carbon atoms, an alkoxycarbonyl group having 4 or more carbon atoms, or an acylamino group having 3 or more carbon atoms, and moreover R_3 is required to be a substituent having such L and B that S value is 544 or less in the equation of

$$S = 3.536L - 2.661B + 535.4$$

wherein L (its unit is Å) represents "L" as a STERIMOL parameter, and B (its unit is Å) represents the smaller value among $B_1 = B_4$ and $B_2 + B_3$ which are STERIMOL parameters, under the condition that R_1 and R_3, or R_0 and R_3 do not represent unsubstituted or substituted aryl groups at the same time; R_4 and R_5 may be the same, and represent unsubstituted or substituted alkyl groups; X_1^- represents a counter anion; and l is 0 or 1, and when an inner salt is formed, l is 0; General formula (II)



wherein Z_1 and Z_2 may be the same or different, and represent nonmetal atomic groups necessary for forming unsubstituted or substituted benzene rings, or unsubstituted or substituted naphthalene rings under the condition that Z_1 and Z_2 do not form unsubstituted or substituted naphthalene rings at the same time, and under the further condition that when Z_1 and/or Z_2 represent benzene rings having a substituent, the substituent does not represent a substituent defined as R_3; R_7 has the same significance with R_2; R_6 and R_8 have the same significances with R_4 and R_5 respectively; X_2^- has the same significance with X_1^-; and n has the same significance with l; General formula (III)



wherein Z_3 and Z_4 may be the same or different, and represent nonmetal atomic groups necessary for forming unsubstituted or substituted benzene rings; Y represents a sulfur atom or a selenium atom; R_9 and R_{11} have the same significances with R_4 and R_5 respectively; R_{10} has the same significance with R_2; X_3^- has the same significance with X_1^-, and n has the same significance with l.

17. The silver photographic emulsion of claim 1 which further contains yellow color-magenta color-and cyan color-forming couplers.

4,889,797

DRY ANALYTICAL ELEMENT HAVING A SPREAD CONTROL AREA FOR ASSAYING ENZYME ACTIVITY

Yoshikazu Amano; Shigeki Kageyama, and Harumi Katsuyama, all of Saitama, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

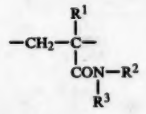
Filed May 26, 1987, Ser. No. 54,432

Claims priority, application Japan, May 28, 1986, 61-122875; May 28, 1986, 61-122876; Jun. 19, 1986, 61-143754

Int. Cl.[4] C12Q *1/00, 1/48;* G01N *33/50, 30/90*

U.S. Cl. 435—4 11 Claims

1. A dry analytical element for assaying an enzyme activity in a liquid, which comprises a support having provided thereon at least a porous liquid-spreading layer composed of water non-absorbent fibers, wherein said porous liquid-spreading layer contains a substrate for an enzyme to be assayed and at least one water soluble hydrophilic polymer in an amount effective to decrease the spreading area of said porous liquid-spreading layer by at least 20%, wherein said hydrophilic polymer is selected from the group consisting of a polymer comprising a repeating unit represented by formula (I)



(I)

wherein R^1 represent a hydrogen atom or a lower alkyl group; and R^2 and R^3 each represents a hydrogen atom, a substituted or unsubstituted aliphatic hydrocarbon residue; a substituted or unsubstituted aromatic hydrocarbon residue, or a substituted or unsubstituted heterocyclic group, or R^2 and R^3 taken together form a ring.

4,889,798

HETEROLOGOUS SYSTEM FOR THE DETECTION OF CHEMICALLY LABELED DNA AND OTHER BIOLOGICAL MATERIALS PROVIDING A RECEPTOR OR TARGET MOIETY THEREON

Elazar Rabbani, New York, N.Y., assignor to Enzo Biochem, Inc., New York, N.Y.

Continuation of Ser. No. 578,732, Feb. 9, 1984, abandoned. This application Feb. 13, 1987, Ser. No. 15,563

Int. Cl.[4] C12Q *1/68;* C07H *21/00;* C12N *9/96;* G01N *33/53*

U.S. Cl. 435—6 24 Claims

1. A composition for detecting the presence or absence of an analyte in a sample, which composition comprises:

a biotinylated polynucleotide specifically bindable with said analyte; a heterologous entity comprising streptavidin and a lectin; and

a signaling entity which comprises a third free complex forming site which is specifically bindable with said lectin and, attached thereto, a signal generating portion capable of forming a signal associated with detection of said analyte.

4,889,799

REAGENT KIT PRODUCING SHORTENED TARGET DNA SEGMENTS USABLE IN SEQUENCING LARGE DNA SEGMENTS

Steven Henikoff, and Richard E. Gelinas, both of Seattle, Wash., assignors to Fred Hutchinson Cancer Research Center, Seattle, Wash.

Division of Ser. No. 581,311, Feb. 17, 1984. This application Apr. 10, 1987, Ser. No. 37,049

Int. Cl.[4] C12Q *1/68;* C12N *15/00, 9/16*

U.S. Cl. 435—6 15 Claims

1. A reagent kit for producing shortened DNA fragments useful for sequencing a target DNA segment, comprising in combination:

(a) a purified exonuclease reagent capable of unidirectionally digesting nucleotide bases synchronously from a target DNA segment; and,

(b) a purified recombinant vector molecule comprising vector DNA, a sequencing primer binding site, and a polylinker region comprising first, second, and third restriction endonuclease sites, the first restriction site being capable of receiving by ligation the target DNA segment, the second and third restriction sites being located between the first restriction site and the sequencing primer binding site, and the second and third restriction sites being so arranged that cleavage of the polylinker region at the second and third restriction sites will produce a linearized vector molecule having a first terminus adjacent the target DNA segment that is susceptible to digestion by the exonuclease reagent and a second terminus, not susceptible to digestion by the exonuclease reagent adjacent the sequencing primer binding site wherein said purified exonuclease reagent and said purified recombinant vector molecule are present in amounts sufficient to produce shortened DNA fragments useful for sequencing a target DNA segment.

4,889,800

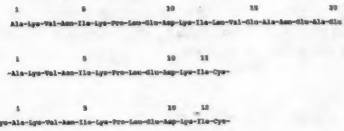
SYNTHETIC POLYPEPTIDES AND RECEPTOR MOLECULES DERIVED THEREFROM AND METHODS OF USE

Thomas M. Shinnick, Del Mar; Percy Minden, LaJolla, and Richard A. Houghten, Solana Beach, all of Calif., assignors to Scripps Clinic and Research Foundation, La Jolla, Calif.

Division of Ser. No. 765,048, Aug. 12, 1985, Pat. No. 4,689,397. This application Aug. 21, 1987, Ser. No. 88,146

Int. Cl.[4] G01N *33/53, 33/563*

U.S. Cl. 435—7 30 Claims



1. A receptor molecule containing an antibody combining site raised to a synthetic immunogen, the synthetic immunogen comprising a synthetic polypeptide containing about 13 to about 40 amino acid residues and including the thirteen amino acid residue sequence, written from left to right in the direction

of the amino-terminus to carboxy-terminus, represented by the formula:

AlaLysValAsnIleLysProLeuGluAspLysIleCys;

said receptor immunoreacting with an antigen to a tuberculous mycobacterium.

2. A diagnostic system in kit form for assaying for the presence of tuberculous mycobacterium comprising:

(a) receptor molecules raised to a synthetic polypeptide containing about 13 to about 40 amino acid residues and including the thirteen amino acid residue sequence, written from left to right in the direction of the amino-terminus to carboxy-terminus, represented by the formula:

AlaLysValAsnIleLysProLeuGluAspLysIleCys; and

(b) indicating means for signalling the immunoreaction of the receptor with an antigen to a tuberculous mycobacterium.

4,889,801

3α-HYDROXYSTEROID OXIDASE AND QUANTITATIVE ANALYSIS OF 3α-HYDROXYSTEROID MAKING USE OF SAME

Koji Ushizawa, Tokyo, Japan, assignor to Daiichi Pure Chemicals Co., Ltd., Tokyo, Japan

Filed Jun. 19, 1987, Ser. No. 63,912

Claims priority, application Japan, Jul. 8, 1986, 61-160325

Int. Cl.[4] C12Q *1/26, 1/28;* C12N *9/08*

U.S. Cl. 435—25 **7 Claims**

1. A 3α-hydroxysteroid oxidase, which oxidizes a 3α-hydroxysteroid and forms a 3-oxosteroid and hydrogen peroxide.

4,889,802

ENHANCED PRODUCTION OF RECOMBINANT PROTEINS IN MYELOMA CELLS

Tristram G. Parslow, and Keith R. Yamamoto, both of San Francisco, Calif., assignors to The Regents of the University of California, Oakland, Calif.

Filed Sep. 24, 1986, Ser. No. 911,259

Int. Cl.[4] C12P *21/00;* C12N *15/00*

U.S. Cl. 435—69.1 **28 Claims**

1. A mammalian myeloma cell, the genome of which comprises a double-stranded DNA molecule containing:

(i) a coding sequence encoding a non-immunoglobulin protein and bounded by a translation start codon at its 5' terminus and a translation stop codon on its 3' terminus;

(ii) a non-immunoglobulin promoter sequence adjacent to the 5' terminus of said coding sequence, said promoter sequence containing a transcription initiation site and capable of initiating transcription of said coding sequence in a mammalian myeloma cell; and

(iii) the 8-base pair nucleotide sequence 5'-ATTTGCAT-3' on the nontranscribed strand located 5' to said transcription initiation site and in a position whereby the rate of transcription of said coding sequence in said mammalian myeloma cell is increased.

4,889,803

PRODUCTION OF INTERFERON GAMMA

Michel Revel, Rehovot; Menachem Rubinstein, Givat-Shmuel, and Yvez Mory, Rehovot, all of Israel, assignors to Yeda Research & Development Co., Ltd., Rehovot, Israel

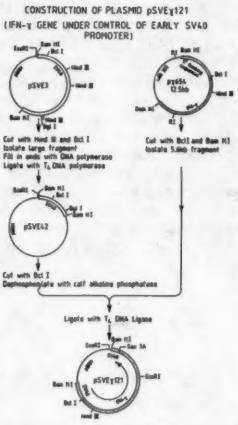
Filed Apr. 26, 1985, Ser. No. 727,673

Claims priority, application Israel, Apr. 27, 1984, 71691

Int. Cl.[4] C12P *21/00, 21/02;* C12N *15/00, 5/00, 1/00*

U.S. Cl. 435—69.51 **15 Claims**

1. A method of producing human gamma interferon which comprises (a) providing Chinese hamster ovary cells bearing a first DNA sequence which codes on expression for human gamma interferon and includes at least one intron of the genomic human gamma interferon gene, said first DNA sequence being operably linked to a constitutive promoter functional in such cells, said promoter being a non-interferon promoter, said cells also bearing a gene coding on expression for dihydrofolate reductase, said gene likewise being operably linked to a constitutive promoter functional in such cells; (b) cultivating


CONSTRUCTION OF PLASMID pSVEγ121
(IFN-γ GENE UNDER CONTROL OF EARLY SV40 PROMOTER)
pSVE3
Pst 1
Cut with Hind III and Bcl I
Isolate large fragment
Fill in ends with DNA polymerase
Ligate with T4 DNA polymerase
pSVE42
Cut with Bcl I
Dephosphorylate with calf intestine phosphatase
Ligate with T4 DNA Ligase
pSVEγ121

the cells in a medium containing methotrexate at a level toxic to cells which do not constitutively express dihydrofolate reductase, whereby the DHFR gene and the gamma interferon gene are co-amplified, and (c) cultivating such cells under conditions in which the cells constitutively express human gamma interferon in recoverable quantities.

4,889,804

BIOCHEMICAL PREPARATION OF ALKENE DERIVATIVES

John A. Schofield, Sittingbourne, United Kingdom, assignor to Shell Oil Company, Houston, Tex.

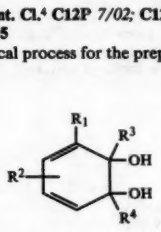
Filed Dec. 21, 1987, Ser. No. 135,212

Claims priority, application United Kingdom, Jan. 1, 1987, 8700462

Int. Cl.[4] C12P *7/02;* C12R *1/40*

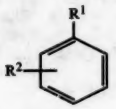
U.S. Cl. 435—155 **16 Claims**

1. A biochemical process for the preparation of a compound of formula (I)



(I)

in which R^1 is an alkenyl group having up to four carbon atoms, R^2 is a hydrogen atom, a halogen atom or an alkyl group having up to four carbon atoms, and R^3 and R^4 are hydrogen atoms in cis-relationship, which comprises preparing a culture of a microorganism selected from *P. putida* NCIB 12190 and mutants thereof; supplying to the culture a compound of formula (II)



(II)

in which R^1 and R^2 are as defined previously in suitable fermentation medium and subsequently recovering a compound of formula (I) in which R^3 and R^4 are both hydrogen atoms in cis-relationship.

4,889,805

CONTINUOUS PROCESS OF OPTIMIZED FERMENTATION FOR THE PRODUCTION OF ALCOHOL

Affonso C. S. Da Silva Telles, R. Prof. Sabóia Ribeiro No 83/404, Leblon, Rio de Janeiro, and Claudio M. Váz, R. Humaitá No 406/1.002, Botafogo, Rio de Janeiro, both of Brazil

Filed May 3, 1988, Ser. No. 189,750
Claims priority, application Brazil, May 20, 1987, 8702590
Int. Cl.[4] C12P *7/06*; C12R *1/865*
U.S. Cl. 435—161 **7 Claims**

1. A continuous and homogeneous process of optimized fermentation of sugars for the production of alcohol, which comprises the following process steps and operational conditions:

(a) continuously feeding a wort with a controlled concentration of sugars in the range of 100 to 160 g/l into one or more than one fermentation vessel arranged in parallel and containing a culture with a concentration of non-flocculant yeast in the range of 10^{11} to 10^{12} cells per liter, said vessel provided with a means for stirring, and completely stirring the fermentation medium to maintain homogeneous fermentation conditions in the medium;

(b) controlling the conditions of the fermentation medium by fixing the temperature in the range of 30° to 39° C. and the pH in the range of 3.2 to 4.5;

(c) continuously removing from the fermenter a stream of wine obtained from the wort fermentation so as to keep the residence time in the fermenter fixed in the range of 4 to 9 hours; and

(d) separating by means of a centrifugation separating device the stream of wine leaving the fermenter into substantially yeast-free stream and a yeast-concentrated stream, said yeast-containing stream being recirculated to the fermenter and said substantially yeast-free stream being led to subsequent processing for the recovery of the alcohol,

the fermentation medium being maintained as homogeneous and constant as possible around the fermenting yeasts under all the conditions in above steps (a), (b) and (c) during the fermentation cycle.

4,889,806

LARGE DNA CLONING SYSTEM BASED ON YEAST ARTIFICIAL CHROMOSOMES

Maynard V. Olson, and David T. Burke, both of St. Louis, Mo., assignors to Washington University, St. Louis, Mo.

Filed Apr. 15, 1987, Ser. No. 38,280
Int. Cl.[4] C12N *15/00, 5/00, 7/00*
U.S. Cl. 435—172.3 **21 Claims**

1. A Saccharomyces yeast artificial chromosome circular vector comprising the DNA sequences of an autonomous replication sequence, a centromere, a selectable yeast marker, two sequences that seed telomere formation in vivo, and a cloning site for insertion of large segments of greater than 50 kb of exogenous DNA within a yeast gene whose interruption is phenotypically visible.

4,889,807

MICROORGANISMS OF THE *PHANEROCHAETE CHRYSOSPORIUM* STRAIN AND THEIR USE

John A. Buswell, Paisley, Scotland, and Etienne Odier, Paris, France, assignors to Institut National de la Recherche Aronomique, France

Filed Dec. 10, 1985, Ser. No. 807,253
Claims priority, application France, Dec. 12, 1984, 84 19028
Int. Cl.[4] C12N *9/08, 9/02, 1/14*
U.S. Cl. 435—192 **20 Claims**

3. A process for producing a culture supernatant which contains lignin-degrading enzyme comprising the steps of:

cultivating a substantially pure culture of a microorganism selected from the group consisting of *Phanerochaete chrysosporium* Burdsall strain C.N.C.M.-I-398 and *Phanerochaete chrysosporium* Burdsall strain C.N.C.M.I-399 at a temperature of from 28° to 40° C. in a nutrient medium containing a source of assimilable nitrogen, assimilable carbon and assimilable mineral salts, such that the lignin-degrading enzyme is produced by the cultivated substantially pure culture of the microorganism and secreted into the nutrient medium, and

separating the nutrient medium from the cultivated substantially pure culture of the microorganism, such that a culture supernatant containing lignin-degrading enzyme is obtained.

4,889,808

METHOD OF ENCHANCING T-PA AND SCU-PA PRODUCTION

Ruth Rappaport, Radnor, Pa., assignor to American Home Products, New York, N.Y.

Continuation-in-part of Ser. No. 782,658, Oct. 1, 1985, abandoned. This application Sep. 17, 1986, Ser. No. 907,004
Int. Cl.[4] C12N *5/02, 9/72*; A61K *37/64*
U.S. Cl. 435—240.1 **39 Claims**

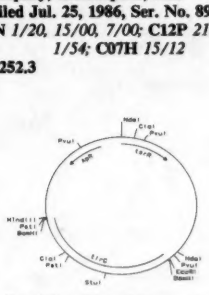
1. A method of enhancing the production of tissue plasminogen activator (t-PA) and single chain urokinase plasminogen activator (SCU-PA) in normal human diploid lung fibroblast cell cultures in a serum-free medium comprising adding to said culture heparin or low molecular weight heparin and an endothelial cell growth factor.

4,889,809

TYLOSIN RESISTANCE-CONFERRING GENE, DESIGNATED TLRC, FOR USE IN *STREPTOMYCES FRADIAE*

Virginia A. Birmingham, Carmel; Karen L. Cox, Martinsville, and Eugene T. Seno, Indianapolis, all of Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.

Filed Jul. 25, 1986, Ser. No. 890,993
Int. Cl.[4] C12N *1/20, 15/00, 7/00*; C12P *21/00, 19/34*; C12R *1/54*; C07H *15/12*
U.S. Cl. 435—252.3 **25 Claims**



Restriction Site and Function Map of Plasmid pSEC10 (8.6 kb)

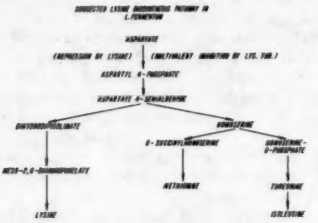
1. The isolated tlrC gene of *Streptomyces fradiae*.

4,889,810

METHOD AND COMPOSITIONS FOR IMPROVING THE NUTRITIVE VALUE OF FOODS VIA *LACTOBACILLUS FEREMENTUM*

Mohamed E. A. El-Megeed, Cairo, Egypt, and David C. Sands, Bozeman, Mont., assignors to Research and Development Institute, Inc. at Montana State University, Bozeman, Mont.

Filed Feb. 13, 1985, Ser. No. 701,214
Int. Cl.[4] C12N *1/20, 15/00, 1/38;* A21D *8/04*
U.S. Cl. 435—252.9 31 Claims



1. An heterofermentative microorganism produced from the bacterial species *Lactobacillus fermentum* comprising a spontaneous mutant of said wild type bacteria, which mutant produces lysine in a bread fermentation medium in greater quantity than the quantity of lysine produced by the wild type *Lactobacillus fermentum.*

4,889,811

METHODS FOR MAKING LEATHER

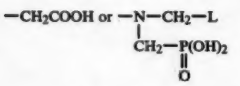
Juergen Christner, Bickenbach; Ernst Pfleiderer, Darmstadt, and Tilmann Taeger, Griesheim, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Filed Sep. 9, 1986, Ser. No. 905,706
Claims priority, application Fed. Rep. of Germany, Sep. 18, 1985, 3533203
Int. Cl.[4] C14C *1/00, 3/00, 5/00*
U.S. Cl. 435—265 16 Claims

1. In a method for making leather from animal skins or hides in one or more wet processing steps employing a surfactant, the improvement wherein all or part of said surfactant is replaced by a phoshonic acid compound of the formula

wherein

(A) Z and Y are hydrogen and



or an ammonium, alkali metal, or alkaline earth metal salt thereof, or wherein

(B) Z is alkyl having from 1 to 3 carbon atoms, Y is —OH, and t,

or wherein

(C) Z is hydrogen or —COOH,

Y is —CH_2COOH, and

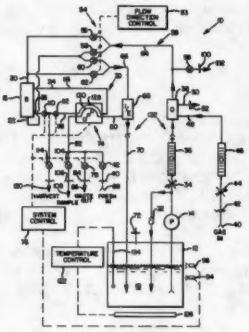
X is —$(CH_2)_2$ —COOH.

4,889,812

BIOREACTOR APPARATUS

Perry W. Guinn, Oregon City; Gary N. Mills, Gladstone; Robert A. Bedient, and Martin O. Greeley, both of Portland, all of Oreg., assignors to C. D. Medical, Inc., Miami Lakes, Fla.

Filed May 12, 1986, Ser. No. 862,014
Int. Cl.[4] C12M *1/04, 1/14, 1/34*
U.S. Cl. 435—289 10 Claims



1. A bioreactor system comprising:

bioreactor means having a shell portion and a tube portion for culturing biological materials;

first circuit means including the tube portion of the bioreactor means for permitting continuous flow of a nutrient fluid through the bioreactor means along a first bioreactor path that defines a loop through the tube portion of the bioreactor means, whereby nutrient fluid is removed from the tube portion and reintroduced thereto, for nourishing the biological materials;

second circuit means including the shell portion of the bioreactor means for permitting flow of a harvest fluid through the bioreactor means along a second bioreactor path that defines a loop through the shell portion of the bioreactor means, whereby harvest fluid is removed from the shell portion and reintroduced thereto; and

reversible pump means (a) for adding fresh nutrient fluid to the first circuit means when operated in a first direction, (b) for withdrawing fluid from the first circuit means when operated in a second direction, and (c) for circulating harvest fluid through the second circuit means when operated in either direction.

4,889,813

PROCESS FOR DETERMINING THE POLARITY OF A CRUDE OIL

Inái M. R. de Andrade Brüning, Rio de Janeiro, Brazil, assignor to Petroleo Brasileiro S.A. - Petrobras, Rio de Janeiro, Brazil

Filed Jul. 21, 1988, Ser. No. 222,662
Claims priority, application Brazil, Jul. 21, 1987, PI-8703790
Int. Cl.[4] G01N *30/02*
U.S. Cl. 436—60 7 Claims

1. A process for determining the relative polarity of a crude oil or fraction thereof comprising:

(a) contacting a known test substance with a stationary phase of the crude oil or fraction in a gas chromatography column, and measuring the interaction between the test substance and the oil;

(b) contacting the known test substance used in (a) with a stationary phase of a non-polar second substance in a gas chromatography column and measuring the interaction between the test substance and the non-polar second substance;

(c) determining the polarity of the crude oil relative to the

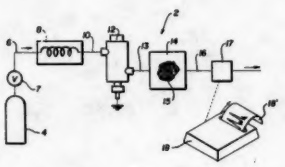
non-polar second substance from the measurements obtained in (a) and (b).

4,889,814

METHOD AND APPARATUS FOR DETECTION OF TRACE IMPURITIES IN AN IMPURE INERT GAS

Marco Succi, Milan, Italy, assignor to SAES Getters SpA, Milan, Italy

Filed Apr. 22, 1988, Ser. No. 184,989
Claims priority, application Italy, May 7, 1987, 20422 A/87
Int. Cl.[4] G01N *21/71*
U.S. Cl. 436—133 8 Claims



1. In a method for the detection of traces of impurity gases in an impure inert gas comprising the stages of passing the impure inert gas through a gas-chromatographic separation column and over a bed of mercuric oxide for the optical measurement of the quantity of mercury released from said bed; the improvement comprising a step between the chromatographic separation and the passage over the bed of mercuric oxide, in which the impure inert gas is subjected to an ionizing discharge which produces cracked impurity gases thereby producing reducing gases capable of reacting with the mercuric oxide thereby releasing mercury vapor in an amount directly proportional to the cracked impurity gases present in the inert impure gas.

3. In an apparatus for the detection of the presence of trace gases as impurities in an impure inert gas comprising a gas-chromatographic separation column, and a mercury vapor detection device having a bed of mercuric oxide connected to a detector of a mercury vapour, the improvement comprising, an ionizer in series between said column and said detector with a passage through which the impure inert gas to be analyzed is obliged to flow, within which there is an electrode capable of generating an ionizing discharge which produces cracked impurity gases thereby producing reducing gases capable of reacting with the mercuric oxide thereby releasing mercury vapor in an amount directly proportional to the cracked impurity gases present in the inert impure gas.

4,889,815

NEPHELOMETRIC METHOD FOR DETERMINATION OF AN ANTIGEN OR ANTIBODY CONTENT IN WHOLE BLOOD

Arthur R. Bradwell, Birmingham, and Ian Deverill, Mansfield, both of England, assignors to Alta Diagnostic Machines Limited, Birmingham, England

Filed Oct. 23, 1986, Ser. No. 922,359
Claims priority, application United Kingdom, Oct. 25, 1985, 8526355
Int. Cl.[4] G01N *33/536, 33/557*
U.S. Cl. 436—517 10 Claims

1. A method of quantifying, in a whole blood sample in which red cells are lysed, an antigen or antibody which will react with a reagent to form an antigen-antibody complex, comprising the steps of:

mixing said sample with said reagent to obtain said complex;

exposing said sample to a source of radiation;

measuring the intensity of radiation scattered through a given angle by said complex, the wavelength of said radiation being selected from the range 460–530 nm; and

relating the measured intensity to the amount of antigen or antibody in said sample.

4,889,816

PROCESS AND APPARATUS FOR CARRYING OUT SPECIFIC BINDING ASSAYS

Paul J. Davis, Bedfordshire, and Philip Porter, Bedford, both of England, assignors to Unilever Patent Holdings B.V., Rotterdam, Netherlands

Filed Jun. 1, 1987, Ser. No. 56,307
Claims priority, application United Kingdom, Jun. 20, 1980, 8020160; PCT Int'l Appl., Jun. 22, 1981, PCT/GB81/00107
Int. Cl.[4] G01N *33/543, 33/545*
U.S. Cl. 436—518 15 Claims

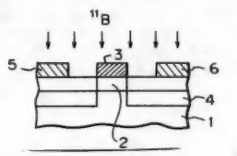
1. In the process for carrying out a specific binding assay comprising the steps of reacting (a) a sample under assay, possibly containing a substance being tested for, with (b) a specific binding partner for the substance being tested for, immobilised on a solid support, and (c) a specific binding partner for the substance being tested for which is conjugated to a detectable marker, thereby to form a complex by reaction between whatever quantities are present of the substance being tested for with reagents (b) and (c), and immobilising the marker to the support via the substance being tested for, the marker being detected or assayed as an index of the quantity of the substance being tested for the present in the sample (a); the improvement which comprises the steps of mixing reaction ingredients (a), (b) and (c) in a single step for reaction in a single reaction liquid, and avoiding competitive interference between the binding reactions of the substance being tested for and reagents (b) and (c) by using a slow-release form of reagent (c), said slow-release form comprising a glaze coated on a surface in contact with the reaction liquid, the specific binding agent (b) being immobilised on the surface of a displacer body which occupies a majority of the volume of a well or cup containing the aqueous liquid in which the specific binding reaction takes place.

4,889,817

METHOD OF MANUFACTURING SCHOTTKY GATE FIELD TRANSISTOR BY ION IMPLANTATION METHOD

Tadashi Saito; Hiroshi Nakamura, and Masanori Tsunotani, all of Tokyo, Japan, assignors to OKI Electric Industry Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 890,656, Jul. 30, 1986, abandoned. This application Dec. 11, 1987, Ser. No. 132,713
Claims priority, application Japan, Aug. 8, 1985, 60-173172; Aug. 9, 1985, 60-174076; Nov. 20, 1985, 60-258712
Int. Cl.[4] H01L *21/265*
U.S. Cl. 437—22 4 Claims



1. A method of manufacturing field effect transistors by an ion-implantation technique comprising the steps of:

(a) preparing a plurality of compound semiconductor substrates, forming field effect transistors on each of said semiconductor substrates, each of said field effect transistors having an active layer formed by ion-implanting donor ions into said substrate and annealing the same at a temperature of about 800° C., each of said substrates having a source electrode, a drain electrode and a Schottky barrier gate electrode thereon, said source electrode and

drain electrode both containing gold and germanium and making ohmic contact with said active layer;

(b) measuring a threshold voltage of said field effect transistors and selecting a substrate in which the threshold voltage of the field effect transistor formed thereon has a value deviating negatively from a predetermined designated voltage; and

(c) selectively ion-implanting impurity ions, which damage the substrate by causing crytal defects therein, in an amount of less than 1.0×10^{11} dose/cm^2 into said selected substrate to form an impurity ion profile such as to have a concentration peak thereof at a location in the substrate deeper than that of a concentration peak of donor ions in said active layer.

4,889,818

PURIFIED THERMOSTABLE ENZYME

David H. Gelfand, Oakland; Susanne Stoffel, El Cerrito; Frances C. Lawyer, Oakland, and Randall K. Saiki, Richmond, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 899,241, Aug. 22, 1986, abandoned. This application Jun. 17, 1987, Ser. No. 63,509

Int. Cl.[4] C12N *9/00*

U.S. Cl. 435—194 **3 Claims**

1. Purified thermostable Thermus aquaticus DNA polymerase that migrates on a denaturing polyacrylamide gel faster than phosphorylase B and more slowly than does bovine serum albumin and has an estimated molecular weight of 86,000–90,000 daltons when compared with a phosphorylase B standard assigned a molecular weight of 92,500 daltons

---

4,889,819

METHOD FOR FABRICATING SHALLOW JUNCTIONS BY PREAMORPHIZING WITH DOPANT OF SAME CONDUCTIVITY AS SUBSTRATE

Bijan Davari, Mahopac; Eti Ganin, Peekskill; David L. Harame, Mohegan Lake, and George A. Sai-Halasz, Mount Kisco, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 20, 1988, Ser. No. 196,398

Int. Cl.[4] H01L *21/265*

U.S. Cl. 437—27 **15 Claims**

1. A method for fabricating shallow junctions of a first conductivity type in a semiconductor, silicon substrate of a second and opposite conductivity type which comprises:

doping said silicon substrate of a second and opposite conductivity type with a dopant of a second and opposite conductivity type than said first conductivity type and wherein said dopant of a second and opposite conductivity type has a molecular weight substantially higher than said substrate, and wherein said doping is to a depth at least sufficient for forming said shallow junctions to preamorphize portions of said substrate; and

then doping said substrate with a dopant of said first conductivity type to form said shallow junctions wherein the dosage of the dopant of said first type is higher than the dosage of said dopant of a second and opposite conductivity type.

4,889,820

METHOD OF PRODUCING A SEMICONDUCTOR DEVICE

Haruhisa Mori, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 9, 1989, Ser. No. 321,201

Claims priority, application Japan, Mar. 14, 1988, 63-060127

Int. Cl.[4] H01L *21/265*

U.S. Cl. 437—29 **12 Claims**

1. A method of producing a semiconductor device comprising the steps of:

preparing a semiconductor substrate,

forming a gate insulating layer on the semiconductor substrate,

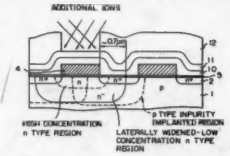
forming a gate electrode on the gate insulating layer,

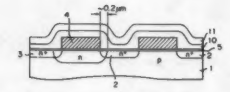
forming a source/drain region in the semiconductor substrate,

forming an insulating cover layer on the entire exposed surface,

forming a mask on the insulating cover layer having an opening over the gate electrode,

implanting one conductivity type impurity ions into the semiconductor substrate through the insulating cover





layer, the gate electrode and the gate insulating layer as a first ion implanting process,

implanting opposite conductivity type impurity ions into the semiconductor substrate therethrough as a second implanting process at an implanting angle larger than that of the first ion implanting process with respect to the normal plane of the semiconductor substrate and to substantially the same depth as in the first ion implanting process and at a dosage smaller than in the first ion implanting process, whereby said one conductivity type impurity ions at laterally spread portions are compensated.

4,889,821

METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE OF THE HETERO-JUNCTION BIPOLAR TRANSISTOR TYPE

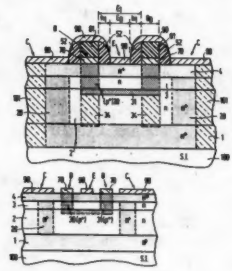
Daniel Selle, Brunoy, and Philippe Boissenot, Paris, both of France, assignors to U.S. Philips Corp., New York, N.Y.

Filed Dec. 28, 1988, Ser. No. 290,926

Claims priority, application France, Dec. 30, 1987, 87 18392

Int. Cl.[4] H01L *29/72, 21/28*

U.S. Cl. 437—31 **14 Claims**



1. A method of manufacturing a semiconductor device of the hetero-junction bipolar transistor type having a planar struc-

ture, said method comprising at least the step of manufacturing a structure comprising successively at least one collector layer of a binary material of a first conductivity type, a base layer of a binary material of the second conductivity type opposite to the first type, an emitter layer of a ternary material of the first conductivity type and a binary highly doped contact layer of the first conductivity type, characterized in that it moreover comprises the steps of:

(a) depositing a layer of silicon nitride (Si_3N_4),

(b) positioning a mask MK_2 defining openings normal to the base regions and etching the layer of silicon nitride (Si_3N_4) through these openings until the surface of the contact layer is exposed by a method which permits of obtaining etching edges perpendicular to the plane of the layers, thus forming in the nitride layer openings remote from each other,

(c) localized implanting of ions of the second conductivity type through the openings of the nitride layer with an energy sufficient to attain the base layer so as to form islands of the second conductivity type connecting the base layer to the surface of the contact layer,

(d) depositing a metallic layer which is formed in the openings as well as on the remaining parts of the nitride (Si_3N_4) layer,

(e) forming a layer of silica (SiO_2) of very large thickness and then planarizing through a known method the device thus obtained down to the upper level of the nitride (Si_3N_4) layer by reactive ion etching (RIE) and ion machining,

(f) selectively etching the remaining parts of the nitride (Si_3N_4) layer to maintain pads of silica (SiO_2) covering the base metallizations,

(g) depositing a fresh layer of silicon nitride (Si_3N_4) and forming by a known method spacers formed in this new layer of nitride, which spacers bear on the edges of the silica (SiO_2) pads intended to reduce the distance between these pads of silica thus forming an opening defining the width of the emitter contact, these spacers also defining the distance between the collector, base and emitter electrodes,

(h) depositing a metallic layer suitable to form the emitter and collector contacts, the pads of silica (SiO_2) and the spacers serving as masks, and then eliminating these dielectric parts, and

(i) localized ion implanting between the collector base and emitter contacts serving as masks of species suitable to form insulating islands between these electrodes with an energy permitting of conductivity type.

4,889,822

MANUFACTURING PROCESS FOR A MONOLITHIC INTEGRATED SEMICONDUCTOR DEVICE HAVING MULTIPLE EPITAXIAL LAYERS WITH A LOW CONCENTRATION OF IMPURITIES

Salvatore Musumeci, Riposto, and Raffaele Zambrano, Mercato S. Severino, both of Italy, assignors to SGS-Thomson Microelectronics S.p.A., Catania, Italy

Filed Sep. 7, 1988, Ser. No. 241,269

Claims priority, application Italy, Sep. 7, 1987, 6621 A/87

Int. Cl.[4] H01L *21/20*

U.S. Cl. 437—31 **7 Claims**

1. A manufacturing process for a monolithic integrated semiconductor device comprising at least one power transistor and an integrated control circuit integrated on a single chip of semiconductor material, comprising the following steps:

growing on a single crystal substrate a first epitaxial layer having a first type of conductivity, obtained by means of doping with a first dopant;

doping the first epitaxial layer with a second dopant;

forming a first region in said first epitaxial layer having a second type of conductivity opposite to the first type of conductivity;

growing a second epitaxial layer having the first type of conductivity, obtained by doping with the first dopant, in such a way that said second epitaxial layer entirely covers the first epitaxial layer and the first region;

forming at least a second region by doping the second epitaxial layer with a third dopant having the first type of conductivity, so that said second region is comprised within the first region;

growing a third epitaxial layer having the first type of conductivity by doping with the first dopant so that said third epitaxial layer entirely covers the second epitaxial layer and the second region;

forming at least one isolation region, having the second type of conductivity, that passes through the third and second epitaxial layers until it reaches the first region and delimits within it at least a first portion of the thrid and second epitaxial layers;

forming within said first portion, delimited by the isolation region, elements of the integrated control circuit;

forming one or more power transistors on the same chip; and

forming electrodes on the front and back of the chip and metal interconnecting tracks among elements of the integrated control circuit and at least one power transistor on the front of the chip.

4,889,823

BIPOLAR TRANSISTOR STRUCTURE FOR VERY HIGH SPEED CIRCUITS AND METHOD FOR THE MANUFACTURE THEREOF

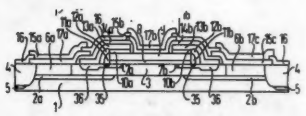
Emmerich Bertagnolli, and Peter Weger, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Division of Ser. No. 19,368, Feb. 26, 1987, abandoned. This application May 30, 1989, Ser. No. 358,672

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1986, 3609721

Int. Cl.[4] H01L *21/265*

U.S. Cl. 437—31 **12 Claims**



1. A method for the manufacture of a very high speed bipolar transistor which comprises:

(a) depositing an epitaxial layer of the second conductivity type on a silicon substrate of the first conductivity type;

(b) generating isolating regions of a dielectric material within said epitaxial layer and in said silicon substrate to separate active transistor regions in said substrate;

(c) implanting ions of said first conductivity type into said epitaxial layer of said second conductivity type;

(d) sequentially depositing on said substrate a layered structure composed of a layer of insulating material, a layer of conductive material of the second conductivity type and a second layer of insulating material;

(e) selectively anisotropically etching said layer structure such that said layer structure covers the portion of said substrate over which an emitter terminal is to be formed;

(f) depositing a layer of conductive material of the second conductivity type over at least the edges of said layer structure in a thickness corresponding to the width of the emitter to be formed therein;

(g) anisotropically etching said last named layer to produce sidewall etching residues at the edges of said layer structure;

(h) applying a surface-wide insulating layer over the substrate;

(i) re-etching the surface-wide insulating layer to produce sidewall insulating layers at said etching residues;

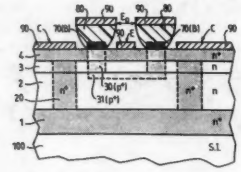
(j) depositing a double layer of conductive material of the first conductivity type and an insulating layer over the resulting surface;
(k) anisotropically etching said double layer to define a base terminal;
(l) depositing and re-etching an insulating layer to produce sidewall insulating layers at said base terminal;
(m) depositing a conductive material of the second conductivity type and structuring the same to form emitter and collector terminals;
(n) subjecting the resulting structure to a high temperature treatment to activate the emitter diffusion zone and the base diffusion zone in said substrate;
(o) applying an intermediate oxide layer over the resulting structure; and
(p) applying metallic terminal electrodes to the emitter, base and collector terminals.

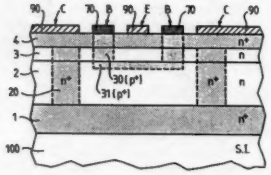
4,889,824

METHOD OF MANUFACTURE SEMICONDUCTOR DEVICE OF THE HETERO-JUNCTION BIPOLAR TRANSISTOR TYPE

Daniel Selle, Brundy; Philippe Boissenot, Paris, and Patrick Rabinzohn, Saint-Maurice, all of France, assignors to U.S. Philips Corp., New York, N.Y.

Filed Dec. 28, 1988, Ser. No. 290,929
Claims priority, application France, Dec. 30, 1987, 87 18391
Int. Cl.[4] H01L *29/72, 21/28*
U.S. Cl. 437—31 **14 Claims**





1. A method of manufacturing a semiconductor device of the hetero-junction bipolar transistor type having a planar structure, said method comprising at least the step of manufacturing a structure comprising successively at least one collector layer of a binary material of a first conductivity type, a base layer of a binary material of the second conductivity type opposite to the first type, an emitter layer of a ternary material of the first conductivity type and a binary highly doped contact layer of the first conductivity type, characterized in that it moreover comprises the steps of:

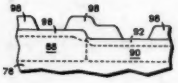
a. depositing a layer of germanium (Ge) and then depositing a layer of silica (SiO_2);
b. positioning a mask MK_2 defining openings normal to the base contact regions and etching the silica layer through said openings until the surface of the germanium layer is exposed by a method which permits of obtaining etching edges perpendicular to the plane of the layers, thus forming openings in the silica layer;
c. etching the germanium layer through the openings of the silica layer by a method which permits of controlling on the etching edges of this germanium layer both the etching rate parallel to the plane of the layers and the etching rate perpendicularly to the plane of the layers in such a manner that the feet of these etching edges define openings having a dimension at least equal to the dimension of the openings of the silica layer and that the tips of these etching edges define with a very high precision openings such that the distance in the germanium between the edge of an opening and the edge of the next opening defines the emitter region and in such a manner that these etching edges have a concavity turned towards the exterior of the device;
d. localized implanting of ions of the second conductivity type through the openings and with an energy sufficient to attain the base layer in order to form islands of the second conductivity type connecting the base layer to the surface of the contact layer;
e. depositing a metallic layer suitable to form the base contacts and then etching selectively the silica layer leaving in tact the pads of the germanium layer;
f. forming a fresh layer of silica (SiO_2) having a very large thickness, planarizing the device at the upper level of the germanium layer and then selectively etching the bond pads of the germanium layer by a method which permits of maintaining with a high precision in negative form the profile of the etching edges defined during the step (c) along the pads of the fresh silica layer remaining at the area of the openings defined during the step (b), these silica pads defining by their upper part openings having a dimension equal to the distance in the germanium between the edge of an opening and the edge of the next opening defined during the step (c);
g. depositing a metallic layer suitable to form the emitter and collector contacts, the pads of the fresh silica layer serving as a mask, and then eliminating the pads of the fresh silica layer; and
h. localized ion implanting between the collector, base and emitter contacts serving as a mask of species suitable to form insulating islands between these electrodes and with an energy which permits of attaining the upper surface of the emitter layer of the first conductivity type.

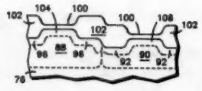
4,889,825

HIGH/LOW DOPING PROFILE FOR TWIN WELL PROCESS

Louis C. Parrillo, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Division of Ser. No. 841,383, Mar. 4, 1986, abandoned. This application Jan. 25, 1988, Ser. No. 147,635
Int. Cl.[4] H01L *21/265, 27/00*
U.S. Cl. 437—34 **4 Claims**





1. A process for fabricating an integrated circuit having a high/low doping profile in twin wells, where the profile is precisely placed using only one photomask for forming the wells and profiles, comprising the steps of:

providing a semiconductor substrate having at least one major planar surface;

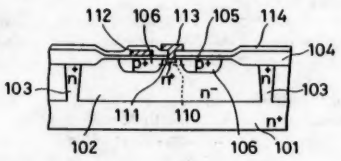
forming a pad dielectric layer over the entire surface of the major planar surface of the substrate;
blanket implanting the entire planar surface with an impurity of a first conductivity type;
forming a pattern of masking material over selected portions of the pad dielectric layer thereby exposing the remainder of the pad dielectric layer in non-selected portions;
physically removing the portion of the pad dielectric layer which is exposed in the non-selected portions of the major planar surface as well as the impurity of the first conductivity type in the portion of the substrate not covered by the masking material,
reforming a pad dielectric layer over the substrate surface remaining and exposed after the removal of the impurity of the first conductivity type, and
implanting an impurity of a second conductivity type into a region of the semiconductor substrate below the region of the substrate having the impurity of the first conductivity type that is removed;
driving in the impurities of the first and second conductivity types to simultaneously form self-aligned deep, low-doped adjacent wells of opposite conductivity to a first selected depth and a second selected depth, respectively;
implanting an impurity of the second conductivity type into the semiconductor substrate not covered by the pattern of masking material;
driving in the implanted impurity of the second conductivity type to form a shallow, relatively high-doped surface layer of the second conductivity type at a third selected depth, where the third selected depth is closer to the substrate surface than to the second selected depth, and where the shallow, relatively high-doped surface layer of the second conductivity type is laterally coextensive with the deep, low-doped well of the second conductivity type;
forming a thick dielectric layer over the shallow, relatively high-doped layer of the second conductivity type;
removing the pattern of masking material;
implanting an impurity of the first conductivity type into the semiconductor substrate not covered by the thick dielectric layer; and
driving in the implanted impurity of the first conductivity type to form a shallow, relatively high-doped surface layer of the first conductivity type at a fourth selected depth, where the fourth selected depth is closer to the substrate surface than to the first selected depth, and where the shallow, relatively high-doped surface layer of the first conductivity type is laterally coextensive with the deep, low-doped well of the first conductivity type.

4,889,826

STATIC INDUCTION TRANSISTOR AND MANUFACTURING METHOD OF THE SAME

Yoshinori Ohta, Ina, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Division of Ser. No. 177,278, Apr. 4, 1988. This application Oct. 3, 1988, Ser. No. 252,729
Claims priority, application Japan, Apr. 28, 1987, 62-103134
Int. Cl.[4] H01L *21/256*
U.S. Cl. 437—40 **8 Claims**



5. A method of manufacturing a static induction transistor having a first type of high-resistance semiconductor which forms a channel region, a source region formed by a first type of diffusion layer which is disposed in a surface region of said first type of high-resistance semiconductor, a gate region which surrounds said source region from at least two directions, and which is formed by a second type of diffusion layer which is diffused in said surface region of said first type of high resistance semiconductor at a depth deeper than the depth diffused in said source region, and a first type of impurity layer formed in said surface region of said first type of high-resistance semiconductor outside of said gate region for the purpose of restricting dark output,

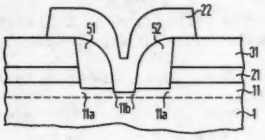
said method of manufacturing said static induction transistor being characterized in that resists are provided on a place where said gate region and said source region will be formed, a first type of impurity is ion-implanted, and selective oxidization is conducted for the purpose of forming said first type of impurity layer beneath a thick oxidized film.

4,889,827

METHOD FOR THE MANUFACTURE OF A MESFET COMPRISING SELF ALIGNED GATE

Josef Willer, Oberschleissheim, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Sep. 22, 1988, Ser. No. 247,662
Claims priority, application Fed. Rep. of Germany, Sep. 23, 1987, 37332048
Int. Cl.[4] H01L *21/316, 21/283*
U.S. Cl. 437—41 **20 Claims**



1. A method for the manufacture of a MESFET having a self-aligned gate comprising a substrate of semiconductor material, a first metal layer, a second metal layer as a gate metal, a first dielectric layer, a first spacer, and a second spacer, employing implantation technique, curing process, mask technique, anisotropic etching technique, and lift-off technique, the method including the steps of:

forming a doping layer with selective implantation and subsequent curing at the surface of the substrate;
a first metal layer, composed of a metal employable for ohmic contact, is applied surface-wide on said doping layer;
a first dielectric layer is applied on the metal layer;
a first lacquer mask layer is applied on the dielectric layer;
a trench is etched out with anisotropic etching in the region left free by the first lacquer mask layer, the trench being etched out through the first dielectric layer and through the first metal layer down into the doping layer of the substrate so that an outer recess of the substrate surface derives in this doping layer;
the trench is etched to such a depth into the doping layer of the substrate that, taking the doping profile of the doping layer into consideration, the prescribed minimum breakdown voltage for the gate to be manufactured is assured;
a second dielectric layer is applied with isotropic deposition onto a surface structured in the recited way;
the second dielectric layer is etched away with anisotropic etching except for a first spacer and a second spacer; and
a second metal layer is applied as gate metal.

4,889,828

PROCESS FOR THE PRODUCTION OF ELECTRICAL ISOLATION ZONES IN A CMOS INTEGRATED CIRCUIT

Pierre Jeuch, Seyssins, France, assignor to Commissiriat a L'Energie Atomique, Paris, France

PCT No. PCT/FR88/00042, § 371 Date Aug. 16, 1988, § 102(e) Date Aug. 16, 1988, PCT Pub. No. WO88/05603, PCT Pub. Date Jul. 28, 1988

PCT Filed Jan. 26, 1988, Ser. No. 249,183

Claims priority, applicstion France, Jan. 26, 1987, 87 00860

Int. Cl.[4] H01L *21/76*

U.S. Cl. 437—34 26 Claims

1. A process for the production of electrical isolation zones serving to isolate the n regions from the p regions of a CMOS integrated circuit formed in a silicon substrate comprising the steps of:

(a) producing a first mask on the substrate having first patterns masking at least partly the p regions and whose sides have in their upper part an inclined profile,

(b) producing a second mask on the substrate having second patterns masking at least partly the n regions, the first mask, being selectively etchable with respect to the second mask, the first and second patterns being spaced and defining between them the location of electrical isolation trenches to be produced,

(c) etching the unmasked substrate regions for forming said trenches,

(d) transferring the inclined profile of the first patterns in the substrate by etching the first mask for forming, in the upper part of the trenches, inclined sides in contact with the p regions, the section of the trenches widening towards the upper surface of the substrate.

4,889,829

METHOD FOR PRODUCING A SEMICONDUCTOR DEVICE HAVING A SILICON-ON-INSULATOR STRUCTURE

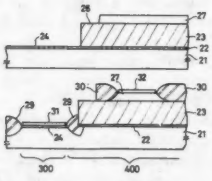
Shinichi Kawai, Tokyo, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Jan. 17, 1989, Ser. No. 297,376

Claims priority, application Japan, Jan. 18, 1988, 63-6850

Int. Cl.[4] H01L *21/76, 21/84*

U.S. Cl. 437—69 6 Claims



1. A method for producing a semiconductor device having a silicon-on-insulator structure, comprising the steps of:

depositing a first insulation film on a silicon substrate by a chemical vapor deposition process;

patterning said first insulation film so as to be left in a silicon-on-insulator (SOI) element region, a portion of said silicon substrate having no first insulation film thereon serving as a bulk element region;

depositing a polysilicon layer on the entire surface of said silicon substrate;

patterning said polysilicon layer so as to be left on said patterned first insulation film, a portion of said patterned polysilicon layer serving as an active region; and

simultaneously forming second and third insulation films for use in element insulation in said silicon substrate and said patterned polysilicon layer, respectively, by a local-oxidation-of-silicon (LOCOS) process, so that said bulk element region is surrounded by said second insulation film, and said SOI element region is surrounded by said third insulation film.

4,889,830

ZINC DIFFUSION IN THE PRESENCE OF CADMIUM INTO INDIUM PHOSPHIDE

Anthony J. Springthorpe, Richmond; Agnes Margittai, Ottawa, and David Eger, Ottawa, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Continuation of Ser. No. 119,274, Nov. 9, 1987, abandoned, which is a continuation of Ser. No. 797,327, Nov. 12, 1985, abandoned. This application Sep. 9, 1988, Ser. No. 243,138

Int. Cl.[4] H01L *21/223*

U.S. Cl. 437—167 10 Claims

1. A method of inhibiting surface degradation of a phosphorous-containing group III–V semiconductor substrate during zinc diffusion into said substrate, the method comprising contacting said substrate with a mixture consisting essentially of elemental zinc vapor and elemental cadmium vapor and diffusing elemental zinc vapor into said substrate in the presence of said elemental cadium vapor at a temperature whereby only zinc detectably diffuses into said substrate and surface degradation is inhibited.

4,889,831

METHOD OF FORMING A HIGH TEMPERATURE STABLE OHMIC CONTACT TO A III–V SUBSTRATE

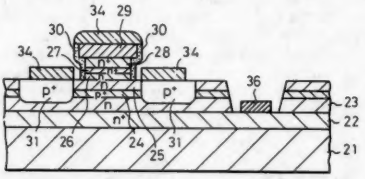
Kazuaki Ishii, Atsugi; Toshiro Futatsugi, Isehara; Toshio Oshima, Atsugi; Toshio Fujii, Atsugi; Naoki Yokoyama, Atsugi, and Akihiro Shibatomi, Machida, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 30, 1987, Ser. No. 126,339

Claims priority, application Japan, May 8, 1987, 62-110712

Int. Cl.[4] H01L *21/44, 21/265*

U.S. Cl. 437—184 9 Claims



1. A process for manufacturing a semiconductor device, comprising the steps of:

preparing a substrate of a III-V compound semiconductor having a type of conductivity;

forming a layer of $In_xGa_{1-x}As$ on the substrate, wherein the layer has x greater than 0 and less than 1, wherein said layer has a type of conductivity the same as the type of conductivity of the substrate, and wherein the layer forms an ohmic contact with the substrate;

forming an electrode of a refractory metal or a silicide thereof on the $In_xGa_{1-x}As$ layer, wherein the electrode has an edge and forms an ohmic contact with the $In_xGa_{1-x}As$ layer;

patterning the $In_xGa_{1-x}As$ layer in alignment with the edge of the electrode with the electrode as a mask;

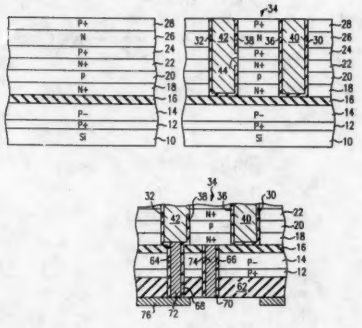
locally implanting an ion into a region of the substrate with the electrode as a mask, so as to have the ion-implanted region of the substrate be made in alignment with the edge of the electrode; and

heat annealing to activate the ion-implanted region of the substrate.

4,889,832
METHOD OF FABRICATING AN INTEGRATED CIRCUIT WITH METAL INTERCONNECTING LAYERS ABOVE AND BELOW ACTIVE CIRCUITRY

Pallab K. Chatterjee, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 23, 1987, Ser. No. 137,546
Int. Cl.[4] H01L *21/22*
U.S. Cl. 437—203 **16 Claims**



1. A method for forming an integrated circuit having interconnects on first and second sides of a semiconductor layer, comprising the steps of:

forming an etch stop layer between the semiconductor layer and a substrate;

forming active circuit elements on the first side of semiconductor layer;

forming an upper interconnect layer in accordance with a predetermined conductive pattern to conductively interface said active circuit elements from the first side;

removing portions of said substrate up to the etch stop layer;

forming vias through the second side of semiconductor layer to expose selected areas of the active elements;

forming a layer of insulating material on the vertical surfaces of said vias;

forming a conductive plug in said vias to contact the exposed surfaces of said active elements; and

forming a bottom interconnect layer in accordance with a predetermined conductive pattern to conductively interface said conductive plugs from the second side.

10. A method for forming an integrated circuit having interconnects above and below active devices therein comprising the steps of;

forming an etch stop layer on the surface of a substrate;

forming a layer of epitaxially grown semiconductor material on the substrate over the etch stop layer to a predetermined thickness;

forming active circuit elements on the epitaxy layer;

forming a first layer of interlevel oxide overlying said epitaxy layer;

forming contact holes through the interlevel oxide layer on the upper surface to expose selected areas of the underlying active circuit elements;

forming a first conductive layer on the upper surface of the interlevel oxide in a predetermined pattern to define a first metal layer that contacts the exposed upper surface of the active elements through the contact holes;

mechanically supporting the integrated circuit to expose the bottom surface of the substrate;

etching the bottom of the substrate up to said etch stop layer;

forming a second layer of interlevel oxide below said etch stop layer;

forming contact holes through said second layer of interlevel oxide layer through the etch stop layer to contact the active circuit elements from the bottom side thereof to expose selected areas thereon;

forming a layer of insulating material on the vertical walls of the contact holes of the second layer to provide insulation from the epitaxy layer and the etch stop layer;

forming conductive plugs in the contact holes through said second interlevel oxide layer; and

forming a second layer of conductive material in a predetermined pattern on the surface of the second layer of interlevel oxide to interconnect with the conductive plugs.

4,889,833
GRANULAR INORGANIC MOLDINGS AND A PROCESS FOR PRODUCTION THEREOF

Seishiro Nakamura, Kurashiki; Katutoshi Oukami, Soja, and Masayuki Asada, Kurashiki, all of Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

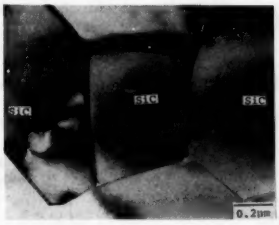
Filed Oct. 1, 1987, Ser. No. 103,492
Claims priority, application Japan, Oct. 6, 1986, 61-238947
Int. Cl.[4] C04B *35/00*
U.S. Cl. 501—1 **5 Claims**

1. A process for producing inorganic granules, comprising burning a porous organic body having inorganic powder compacted therein, thereby to produce calcined inorganic granules having a shape determined by said porous organic body.

4,889,834
SIC-AL_2O_3 COMPOSITE SINTERED BODIES AND METHOD OF PRODUCING THE SAME

Koichi Niihara, and Atsushi Nakahira, both of Yokosuka, Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Sep. 20, 1988, Ser. No. 246,799
Claims priority, application Japan, Sep. 30, 1987, 62-244159
Int. Cl.[4] C04B *35/10, 35/56*
U.S. Cl. 501—89 **1 Claim**



1. An SiC-Al_2O_3 composite sintered body, consisting essentially of:

a matrix of Al_2O_3 grains, said grains having a grain size of not greater than 5 μm; and

2–10 mol % SiC grains dispersed essentially inside individual Al_2O_3 grains, said SiC grains having a grain size of not greater than 0.5μm;

wherein said composite sintered body has a K_{IC} of not less than 5.0 $MPam^{0.5}$.

4,889,835

SIC-AL_2O_3 COMPOSITE SINTERED BODIES AND METHOD OF PRODUCING THE SAME

Koichi Niihara, and Atsushi Nakahira, both of Yokosuka, Japan, assignors to NGK Insulators, Ltd., Nagaya, Japan

Filed Sep. 20, 1988, Ser. No. 246,801

Claims priority, application Japan, Sep. 30, 1987, 62-244158

Int. Cl.[4] C04B *35/10, 35/80*

U.S. Cl. 501—89 8 Claims

1. An SiC-Al_2O_3 composite sintered body, consisting essentially of:

a matrix phase consisting of Al_2O_3 grains having a grain size of not greater than 5 μm;

2–20 mol% SiC grains having a grain size of not greater than 1 μm; and

2–20 mol% SiC whiskers having a diameter range of 0.5–5 μm and an aspect ratio of not less than 3.

4,889,836

TITANIUM DIBORIDE-BASED COMPOSITE ARTICLES WITH IMPROVED FRACTURE TOUGHNESS

Sergej-Tomislav V. Buljan, Acton, and Earl G. Geary, Jr., Lexington, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Feb. 22, 1988, Ser. No. 158,491

Int. Cl.[4] C04B *35/58*

U.S. Cl. 501—97 13 Claims

11. A densified, hard, abrasion resistant ceramic-based composite article consisting essentially of:

about 5–60 volume percent of one or more first dispersoids selected from the group consisting of whiskers and chopped fibers of refractory carbides, nitrides, and carbonitrides of titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum, and tungsten, and solid solutions thereof, uniformly distributed in a matrix of titanium diboride; and

about 5–55 volume percent of one or more other dispersoids selected from the group consisting of particles of refractory carbides, nitrides, and carbonitrides of titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum, and tungsten, and solid solutions thereof, and whiskers, fibers, and particles of hard refractory hafnium diboride, tungsten diboride, silicon nitride, alumina, zirconia, and hafnia, and mixtures and solid solutions thereof, the combined percent of all dispersoids not exceeding about 60 volume percent.

4,889,837

SEMICONDUCTIVE CERAMIC COMPOSITION

Shuichi Ono; Shuichi Itagaki, and Masahiro Yahagi, all of Akita, Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Aug. 21, 1987, Ser. No. 88,071

Claims priority, application Japan, Sep. 2, 1986, 61-205071; Dec. 26, 1986, 61-313725

Int. Cl.[4] C04B *35/46*

U.S. Cl. 501—139 3 Claims

1. A semiconductive ceramic composition comprising:

a base component comprising $SrTiO_3$; and

a minor component comprising $CaTiO_3$, $BaTiO_3$, Y_2O_3 and Nb_2O_5;

said $SrTiO_3$ comprising SrO and TiO_2 in a molar ratio of 0.970 to 1.000:1.000;

the relationship between said $CaTiO_3$ and said SrO falls within the following limits

0.1 to 20.0 mol% $CaTiO_3$ relative to 1.000 mol SrO,

1.0 to 20.0 mol% $CaTiO_3$ relative to 0.990 mol SrO,

5.0 to 20.0 mol% $CaTiO_3$ relative to 0.980 mol SrO, and

10.0 to 20.0 mol% $CaTiO_3$ relative to 0.970 mol SrO;

said $BaTiO_3$ being present in an amount of 0.05 to 3.0 mol% and said Y_2O_3 and Nb_2O_5 being present in amounts of 0.1 to 1.0 mol% and 0.1 to 0.4 mol%, respectively.

4,889,838

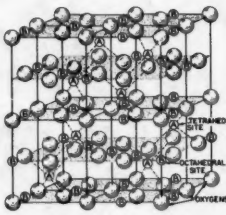
REDISTRIBUTION OF ORGANOHALOSILANES UTILIZING HEAT TREATED CRYSTALLINE ALUMINA CATALYSTS

Kenrick M. Lewis, New York, N.Y., and Ching-Feng Chang, Strongsville, Ohio, assignors to Union Carbide Corporation and Plastics Company Inc., Danbury, Conn.

Filed Dec. 22, 1983, Ser. No. 564,374

Int. Cl.[4] B01J *38/60;* C07F *7/12*

U.S. Cl. 502—27 3 Claims



1. A method for redistributing the halogen atom of a halosilane and at least one member selected from the group consisting of the hydrocarbyl group of a hydrocarbylsilane and the hydrogen atom of a hydrosilane which method comprises contacting a mixture of the halosilane, hydrocarbylsilane and/or the hydrosilane, with a heat treated crystalline gamma alumina or eta alumina catalyst at 200° C.–450° C. for a maximum contact time of ten minutes, said heat treated catalyst having been activated at 400° C.–500° C. and regenerated by a process comprising heating the catalyst with a 2% aqueous hydrogen fluoride solution before activation.

4,889,839

LAYERED TITANATE CONTAINING INTERSPATHIC SILICA CATALYSTS

Pochen Chu, West Deptford; Larry A. Green, Mickleton, and Michael E. Landis, Woodbury, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 26,426, Mar. 16, 1987, Pat. No. 4,777,268, and a continuation-in-part of Ser. No. 879,787, Jun. 27, 1986, which is a continuation-in-part of Ser. No. 687,414, Dec. 28, 1984, abandoned. This application Oct. 11, 1988, Ser. No. 255,687

Int. Cl.[4] B01J *21/06, 23/22*

U.S. Cl. 502—242 7 Claims

1. A catalyst composition which comprises a layered trititanate containing interspathic polymeric silica and having an element selected from the group consisting of V and Sn associated therewith.

2. The composition of claim 1 wherein said layered trititanate is hydrogen-exchanged.

3. The composition of claim 2 wherein said layered trititanate is hydrogen-exchanged, said element is V and said composition comprises an inorganic oxide binder.

4,889,840

CATALYST COMPOSITIONS USEFUL FOR OLEFIN ISOMERIZATION AND DISPROPORTIONATION AND METHOD FOR PREPARING THE CATALYST COMPOSITIONS

Charles A. Drake, Nowata, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 832,547, Feb. 24, 1986, Pat. No. 4,684,760.
This application Mar. 30, 1987, Ser. No. 31,830
Int. Cl.[4] B01J *21/04, 21/06, 21/10, 23/04*
U.S. Cl. 502—255 22 Claims

9. A catalyst composition comprising an alumina support having a surface area of at least 200 m^2/g and a pore volume of at least 0.45 cm^3/g on which is deposited by impregnation

i up to 20 wt. % of magnesium oxide, based on the weight of support and calculated as the metal;

0 up to 5 wt. % of at least one alkali metal oxide, based on the weight of support and calculated as the metal; and

0 up to 5 wt. % of zirconium oxide, based on the weight of support and calculated as the metal.

4,889,841

THERMOSENSITIVE RECORDING MATERIALS

Takao Kosaka, Himeji; Masahiro Miyauchi, Takasago; Naomasa Koike, and Masahiro Higuchi, both of Tokyo, all of Japan, assignors to Mitsubishi Paper Mills Limited, Tokyo, Japan

Filed Jul. 18, 1988, Ser. No. 220,454
Claims priority, application Japan, Jul. 25, 1987, 62-185753; Sep. 11, 1987, 62-227715
Int. Cl.[4] B41M *5/18*
U.S. Cl. 503—209 4 Claims

1. A thermosensitive recording material comprising an underlying support having provided thereon a thermosensitive recording layer comprising:

(1) a substantially colorless dye precursor,

(2) an electron donating developer capable of developing a color of the dye precursor, and,

(3) as an additive, 2-benzyloxynaphthalene and p-benzylbiphenyl in a mixing ratio of 95:5 to 70:30 (by weight).

4,889,842

CONCANAVALIN A DIMERS AS THERAPEUTIC AGENTS

Randall E. Morris, 1765 Fallen Leaf La., Los Altos, Calif. 94022

Filed Mar. 3, 1987, Ser. No. 21,295
Int. Cl.[4] A61K *37/10;* A01N *1/02*
U.S. Cl. 514—8 9 Claims

1. A method of inducing immunoregulation in a mammal in need of immunoregulation comprising administering to such mammal an effective immunoregulatory amount of homogeneous concanavalin A dimer in a pharmaceutically acceptable carrier.

5. A treated donor organ for transplantation comprising the organ in combination with a pharmaceutical preparation comprising an effective amount of homogeneous concanavalin A dimer.

4,889,843

SALT OF TRISACCHARIDE, AND COMPOSITION AND PROCESS FOR RE-STIMULATING HAIR GROWTH

Giovanni Gazzani, Appiano Gentile, Italy, assignor to Crinos Industria Farmacobiologica Spa., Villa Guardia, Italy

Continuation of Ser. No. 916,881, Oct. 9, 1986, abandoned. This application Jan. 17, 1989, Ser. No. 298,213
Claims priority, application Italy, Oct. 10, 1985, 22424 A/85
Int. Cl.[4] C08B *37/08;* A61K *7/06, 35/00*
U.S. Cl. 514—54 8 Claims

1. A salt of trichosaccharide with 2,4-diamino-6-piperidino-pyrimidine-3-oxide, the ratio of trichosaccharide to the 2,4-diamino-6-piperidino-pyrimidine-3-oxide being between 1:1 and 1:0.25.

4,889,844

FRUCTOSE CONTAINING WOUND HEALING PREPARATION

Anthony N. Silvetti, Sr., and Anthony N. Silvetti, Jr., both of 930 Ashland Ave., River Forest, Ill. 60305

Continuation of Ser. No. 790,059, Oct. 22, 1985, abandoned. This application Oct. 16, 1987, Ser. No. 109,811
Int. Cl.[4] A61K *31/70, 31/715*
U.S. Cl. 514—60 18 Claims

1. A method of treating wounds in a host in need of such treatment which comprises contacting the wound, for a period of time sufficient to initiate wound healing, with a therapeutically effective amount of a composition comprising fructose and starch hydrolysate.

4,889,845

VEHICLE FOR TOPICAL APPLICATION OF PHARMACEUTICALS

Lawrence Ritter, Suffern, and James R. Lawter, Goshen, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

Continuation of Ser. No. 870,392, Jun. 9, 1986, abandoned. This application Jan. 19, 1988, Ser. No. 145,451
Int. Cl.[4] A61K *31/695, 31/557*
U.S. Cl. 514—63 7 Claims

1. A vehicle for topical application consisting essentially of

(a) from 1 to 50 percent by weight of a polydimethylsiloxane having a viscosity of from 20 to 1,000,000 centistokes;

(b) from 2 to 60 percent by weight of C_{12}–C_{15} alcohols benzoate, isopropyl palmitate, isopropyl myristate, diisopropyl adipate, octyl hydroxystearate, PPG-2 myristyl ether propionate, almond oil, or mixtures thereof; and

(c) sufficient volatile silicones selected from the group consisting of octamethylcyclotetrasiloxane, decamethylcyclopentasiloxane and hexamethyldisiloxane, or a pharmaceutically acceptable chlorofluorocarbon to provide 100 percent by weight of said vehicle.

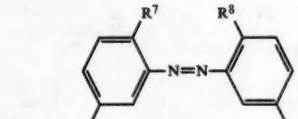
4,889,846

3-(2,5-DISUBSTITUTED PHENYLAZO)-4-SUBSTITUTED PHENYLALKAN-1-OIC ACIDS AND ESTERS THEREOF AND METHOD OF TREATING INFLAMMATORY DISORDERS THEREWITH

Roger Crossley, Woodley, England, assignor to John Wyeth & Brother Limited, Maidenhead, England

Filed Apr. 15, 1988, Ser. No. 181,856
Claims priority, application United Kingdom, Apr. 16, 1987, 8709248
Int. Cl.[4] A61K *31/655;* C07C *107/06;* C09B *27/00, 41/00*
U.S. Cl. 514—150 12 Claims

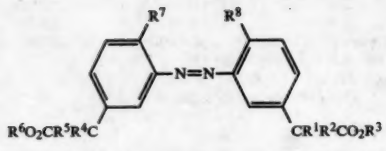
1. A compound of formula I:



(I)

or a salt thereof, in which formula R^1, R^2, R^3, R^4, R^5, and R^6 are each independently hydrogen or lower alkyl, R^7 and R^8 are each independently alkyl of 1 to 7 carbon atom or cycloalkyl of 5 to 7 carbon atoms or cycloalkyl of 5 to 7 carbon atoms substituted by lower alkyl.

12. A method for the treatment of inflammatory bowel disease in a human so afflicted which comprises administering an effective amount of a compound of formula:



or a salt thereof, in which formula R^1, R^2, R^3, R^4, R^5, and R^6 are each independently hydrogen or lower alkyl, R^7 and R^8 are each independently alkyl of 1 to 7 carbon atom or cycloalkyl of 5 to 7 carbon atoms or cycloalkyl of 5 to 7 carbon atoms substituted by lower alkyl.

4,889,847

PREVENTION OF GLUCOCORTICOID-INDUCED SKIN ATROPHY

Albert M. Kligman, Philadelphia, Pa.; James A. Mezick, East Brunswick, N.J., and Robert J. Capetola, Doylestown, Pa., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Nov. 3, 1986, Ser. No. 925,935

Int. Cl.[4] A61K *31/07, 31/56*

U.S. Cl. 514—171 **15 Claims**

1. A method for the prevention of glucocorticoid-induced skin atrophy which comprises topically administering to the glucocorticoid-treated skin a pharmaceutical composition comprising an effective amount of a retinoid and a pharmaceutically acceptable carrier.

4,889,848

TRICYCLIC PYRIDINE DERIVATIVES

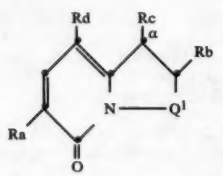
Ulf Fischer, Frenkendorf; Fernand Schneider, Basel, and Ulrich Widmer, Rheinfelden, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 793,511, Oct. 31, 1985, Pat. No. 4,735,940. This application Jan. 5, 1988, Ser. No. 141,022

Int. Cl.[4] A61K *31/435;* **C07D** *221/04*

U.S. Cl. 514—212 **34 Claims**

1. A compound of the formula

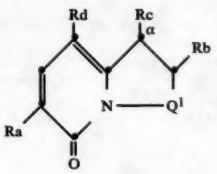


I

wherein Q^1 and the nitrogen atom taken together is a group of the formula $>N—CH_2CH_2—$ or $>N—CH=CH—$, Ra is phenyl, pyridyl or thienyl group which can be substituted by halogen, trifluoromethyl, nitro, lower alkyl or lower alkoxy, Rb and Rc together with the carbon atom denoted by α are a group of the formula $>C_\alpha—CH=CH—CH=CH—$ which may be substituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro, amino or mono- or di(lower alkyl)amino, and the dotted line signifies an additional bond, Rd is the group of the formula

wherein R^1 is hydroxy, lower alkoxy, a group of the formula $—NR^3R^4$ or an unsubstituted 5-membered, saturated, partially unsaturated or aromatic heterocycle selected from the group consisting of 2-oxazolyl, 1,2,4-oxadiazolyl, 2-thiazolyl, and 2-tetrahydrofuryl; which is attached via a carbon atom and which can be substituted by one or two lower alkyl groups and can be substituted by a (C_{3-6})-cyclo-alkyl, hydroxy, lower alkoxy, lower alkanoyloxy, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, lower alkoxycarbonyl, lower alkanoyl, carbamoyl, mono- or di(lower alkyl)carbamoyl, oxo or alkylenedioxy group, R^3 and R^4 each, independently, is hydrogen, lower alkyl, lower alkoxyalkyl, lower dialkoxyalkyl, lower alkyl substituted by lower alkylenedioxy; lower cyanoalkyl, lower haloalkyl, lower hydroxyalkyl, lower dihydroxyalkyl, lower alkanoyl, lower alkoxycarbonyl or a (C_{3-7})-cycloalkyl group which can be substituted by hydroxy, lower alkoxy, lower alkanoyloxy, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, oxo, carbamoyl, mono- or di(lower alkyl)carbamoyl or by lower alkylenedioxy or together with the nitrogen atom are an unsubstituted 3- to 7-membered, saturated N-heterocycle selected from the group consisting of azetidinyl, pyrrolidinyl, morpholinyl, thiomorpholinyl, piperazinyl, and piperidinyl; which can be substituted by one or two lower alkyl groups and can be substituted by one or two hydroxy, lower alkoxy, lower alkanoyloxy, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, lower alkoxycarbonyl, lower alkanoyl, carbamoyl, mono- or di(lower alkyl)carbamoyl, oxo or lower alkylenedioxy groups and which can contain as a ring member an oxygen or sulfur atom or the group $>N-R^5$, and R^5 is hydrogen, lower alkyl, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, lower alkanoyl, lower alkoxycarbonyl, carbamoyl or mono- or di(lower alkyl)carbamoyl, or a pharmaceutically acceptable acid addition salt of a compound of formula I which has one or more basic substituents.

24. A pharmaceutical composition comprising an effective amount of a compound of the formula



I

wherein Q^1 and the nitrogen atom taken together is a group of the formula $>N—CH_2CH_2—$ or $>N—CH=CH—$, Ra is phenyl, pyridyl or thienyl group which can be substituted by halogen, trifluoro-methyl, nitro, lower alkyl or lower alkoxy, Rb and Rc together with the carbon atom denoted by α are a group of the formula $>C_\alpha—CH=CH—CH=CH—$ which may be substituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro, amino or mono- or di(lower alkyl)amino, and the dotted line signifies an additional bond, Rd is the group of the formula

wherein R^1 is hydroxy, lower alkoxy, a group of the formula $—NR^3R^4$ or an unsubstituted 5-membered, saturated, partially unsaturated or aromatic heterocycle selected from the group consisting of 2-oxazolyl, 1,2,4-oxadiazolyl, 2-thiazolyl, and 2-tetrahydrofuryl which is attached via a carbon atom and which can be substituted by one or two lower alkyl groups and can be substituted by a (C_{3-6})cycloalkyl, hydroxyl, lower alkoxy, lower alkanoyloxy, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, lower alkoxycarbonyl, lower alkanoyl, carbamoyl, mono- or di(lower alkyl)carbamoyl, oxo or alkylenedioxy group, R^3 and R^4 each, independently, is hydrogen, lower alkyl, lower alkoxyalkyl, lower dialkoxyalkyl, lower alkylene-dioxyalkyl, lower cyanoalkyl, lower haloalkyl, lower hydroxyalkyl, lower dihydroxyalkyl, lower alkanoyl, lower alkoxycarbonyl or a (C_{3-7})-cycloalkyl group which

can be substituted by hydroxy, lower alkoxy, lower alkanoyloxy, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyl-oxyalkyl, oxo, carbamoyl, mono- or di(lower alkyl)-carbamoyl or by lower alkylenedioxy or together with the nitrogen atom are an unsubstituted 3- to 7-membered, saturated N-heterocycle selected from the group consisting of azetidinyl, pyrrolidinyl, morpholinyl, thiomorpholinyl, piperazinyl, and piperidinyl which can be substituted by one or two lower alkyl groups and can be substituted by one or two hydroxy, lower alkoxy, lower alkanoyloxy, lower hydroxyalkyl, lower alkoxy-alkyl, lower alkanoyloxyalkyl, lower alkoxycarbonyl, lower alkanoyl, carbamoyl, mono- or di(lower alkyl)carbamoyl, oxo or lower alkylenedioxy groups and which can contain as a ring member an oxygen or sulfur atom or the group $>N-R^5$, and R^5 is hydrogen, lower alkyl, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, lower alkanoyl, lower alkoxycarbonyl, carbamoyl or mono- or di(lower alkyl)carbamoyl,

or a pharmaceutically acceptable acid addition salt of a compound of formula I which has one or more basic substituents, and an inert pharmaceutical carrier.

4,889,849
SPASMOLYTICALLY ACTIVE TERTIARY AMINE DERIVATIVES

Ineke Van Wijngaarden; Johannes M. A. Zwagemakers, and Jan Van Dijk, all of Weesp, Netherlands, assignors to Duphar International Research B.V., Weesp, Netherlands

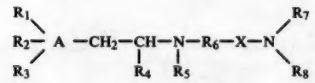
Continuation of Ser. No. 773,659, Sep. 9, 1985, abandoned. This application Jan. 9, 1989, Ser. No. 294,997

Claims priority, application Netherlands, Sep. 12, 1984, 8402783

Int. Cl.[4] A61K *31/535, 31/54;* **C07D** *265/30, 279/06*

U.S. Cl. 514—218 **3 Claims**

1. A spasmolytically active tertiary amine derivative, acid addition salts and prodrugs thereof of the formula:



wherein

A is a phenyl nucleus;

R_1 and R_2 may be equal or different and are hydrogen, alkyl having 1–3 carbon atoms, hydroxylalkyl or mercaptoalkyl having 1–3 carbon atoms which may be etherified or esterified, alkoxy having 1–3 carbon atoms, the group $S(O)_m—R_9$, wherein R_9 is an alkyl group having 1–3 carbon atoms, and m has the value 0, 1 or 2, a group $-NR_{10}R_{11}$, wherein R_{10} and R_{11} represent alkyl having 1–3 carbon atoms, or together may form a saturated, 5 or 6 membered ring optionally containing a member selected from the group consisting of sulphur, oxygen and nitrogen; hydroxy group, mercapto group or amino group, which groups may be derived with an easily removable ester group or ether group; or a halogen atom, or R_1 and R_2 together may form a 5- or 6-membered saturated ring optionally containing 1 or 2 members selected from the group consisting of oxygen, nitrogen and sulphur atoms, which ring is condensed with the phenyl nucleus and may by substituted with one or more alkyl groups having 1–3 carbon atoms, optionally etherified or esterified hydroxy-alkyl having 1–3 carbon atoms or with an oxygen atom;

R_1 is a hydrogen atom or, together with R_4, may form a ring consisting of 6 or 7 carbon atoms;

at least one of R_1, R_2 and R_3 being other than hydrogen;

R_4 is a hydrogen atom or alkyl group having 1–3 carbon atoms;

R_5 is a straight, branched or cyclic alkyl group having 1–4 carbon atoms;

R_6 is a straight or branched, saturated or unsaturated alkylene group having a chain length of 3–6 carbon atoms;

X is a carbonyl group, thiocarbonyl group or SO_2 group;

R_7 and R_8, together with the nitrogen atom to which they are bound, constitute a fully or partly saturated heterocyclic ring consisting of 5–8 ring atoms optionally containing an oxygen, nitrogen or sulfur atom as the second hetero atom, and optionally containing at least one member selected from the group [consisting of members selected from the group] consisting of 1 to 2 alkyl groups having 1–3 carbon atoms, an alkylene bridge of 2 or 3 carbon atoms across the ring; or oxygen, provided that when the substituent is oxygen having a keto function it has the form of a ketal or oxim, or the ring formed by the R_7 and R_8 may be substituted directly or via an alkylene chain of 1–3 carbon atoms, with 1 or 2 members selected from the group consisting of phenyl, optionally containing halogen; alkyl or alkoxy having 1–3 carbon atoms, hydroxy, amino, mono- or dialkylamino having 1–3 carbon atoms in the alkyl group(s), alkanoyl or thioalkanoyl having 1–3 carbon atoms, hydroxy alkanoyl having 1–3 carbon atoms, benzoyl, optionally esterified or etherified hydroxy or mercapto, optionally mono- or dialkyl or -acyl substituted amino, carbalkoxy having 1–3 carbon atoms in the alkoxy group, a carbamoyl, thio carbamoyl, sulfamoyl or carbamoyloxy group of which the nitrogen atom may be substituted by 1 or 2 alkoxy groups having 1–3 carbon atoms or alkyl groups having 1–5 carbon atoms, which, via a nitrogen, oxygen or sulphur atom, may form a saturated heterocyclic group consisting of 5 or 6 ring atoms.

3. Spasmolytically active compositions, characterized in that they comprise at least one compound of claim 1 as the active component in form suitable for administration.

4,889,850
TREATMENT OF COLIC AND TEETHING

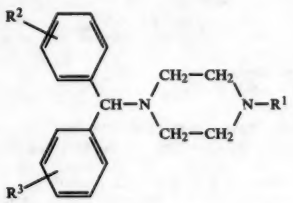
Carl R. Thornfeldt, 1054 NW. 2nd Ave., and Robert E. Thornfeldt, 1021 SW. 5th Ave., both of Ontario, Oreg. 97914

Continuation of Ser. No. 48,275, May 11, 1987, abandoned. This application Dec. 28, 1988, Ser. No. 291,475

Int. Cl.[4] A61K *31/55, 31/495*

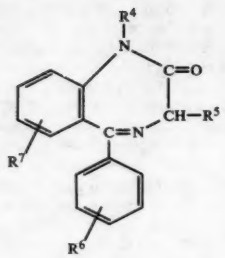
U.S. Cl. 514—221 **13 Claims**

1. A method for the treatment of a subject suffering from a condition selected from the group consisting of teething and colic, said method comprising administering to said subject a therapeutically effective amount of a composition comprising an ataractic and a benzodiazepine having sedative hypnotic activity; said ataractic having the formula



(I)

wherein R^1 is a member selected from the group consisting of C_1–C_6 alkyl, hydroxy-(C_1–C_6 alkyl), hydroxy-(C_1–C_6 alkoxy)-(C_1–C_6 alkyl), phenyl-(C_1–C_6 alkyl), and (C_1–C_6 alkyl)-phenyl-(C_1–C_6 alkyl); and R^2 and R^3 are members independently selected from the group consisting of a hydrogen atom, a halogen atom, and C_1–C_6 alkyl; or an acid salt thereof; and said benzodiazepine having the formula



(II)

wherein R^4 is a member selected from the group consisting of hydrogen, C_1–C_6 alkyl, C_3–C_6 cycloalkyl, C_1–C_6 haloalkyl, amino-(C_1–C_6 alkyl), (C_1–C_3 alkylamino)-(C_1–C_3 alkyl), and di-(C_1–C_3 alkyl)-amino-(C_1–C_6 alkyl); R^5 is a member selected from the group consisting of a hydrogen atom, hydroxy, and carboxy; R^6 is a member selected from the group consisting of a hydrogen atom, a halogen atom, and C_1–C_6 alkyl; and R^7 is a member selected from the group consisting of a hydrogen atom, a halogen atom, and C_1–C_6 alkyl; or a salt thereof; and the mole ratio of said ataractic to said benzodiazepine being from about 0.05 to about 2.0.

4,889,851

BENZOTHIADIAZINE COMPOUNDS, AND PHARMACEUTICAL COMPOSITION COMPRISING THE SAME

Teruo Oku; Eishiro Todo; Chiyoshi Kasahara; Katsuya Nakamura, and Hiroshi Kayakiri, all of Ibaraki, Japan, assignors to Fujisawa Pharmaceutical Co, Ltd., Osaka, Japan

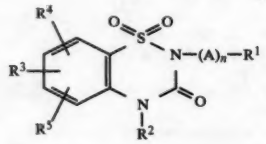
Filed Nov. 5, 1987, Ser. No. 116,913

Claims priority, application United Kingdom, Nov. 21, 1986, 8627857; Jun. 22, 1987, 8714598; Sep. 2, 1987, 8720659

Int. Cl.[4] C07D *285/24;* **A61K** *31/54*

U.S. Cl. 514—223.2 **7 Claims**

1. A compound of the formula:



wherein R^1 is phenyl, pheny which is substituted with halogen, lower alkyl, alkoxy, halo lower alkyl, lower alkylamino, lower alkylthio, phenoxy, carboxy, lower alkoxycarbonyl, carboxy lower alkyl, lower alkoxycarbonyl lower alkyl, cyclo lower alkyl; lower alkyl which is substituted with carboxy or lower alkoxycabronyl; or pyrimidinyl, pyridyl or pyridyl which is substituted with lower alkyl;

A is lower alkylene;

n is an integer of 0 to 1;

R^2 is lower alkyl;

R^3 is hydrogen; hydroxy; halogen; halo lower alkyl; lower alkyl; lower alkylamino; lower alkanoyl amino; lower alkanoyl lower alkylamino; lower alkoxy; lower alkoxy which is substituted with phenyl, phthalimido, pyranyl, amino, carboxy, lower alkoxycarbonyl, cyclo lower alkyl or cyclo lower alkyl which is substituted with amino lower alkyl or lower alkoxycarbonylamino lower alkyl; or cyclo lower alkyloxy or cyclo lower alkyloxy which is substituted with carboxy or lower alkoxycarbonyl;

R^4 is hydrogen or halogen, and

R^5 is hydrogen or halogen, with the proviso that

R^1 is phenyl substituted with lower alkoxy, lower alkylamino, lower alkylthio, phenoxy, carboxy, lower alkoxycarbonyl, carboxy lower alkyl or lower alkoxycarbonyl lower alkyl; lower alkyl or lower alkyl substituted with carboxy or lower alkoxycarbonyl; pyrimidinyl; pyridyl or pyridyl substituted with lower alkyl, when R^3 is hydrogen or halogen, or a pharmaceutically acceptable salt thereof.

7. A method for the treatment of bone diseases exhibiting abnormal bone metabolism in mammals by administering one or more compounds of claim 1, or pharmaceutically acceptable salts thereof to a mammal.

4,889,852

ANXIOLYTICALLY ACTIVE PIPERAZINE DERIVATIVES

Jan Hartog, and Johannes Mos, both of Weesp, Netherlands, assignors to Duphar International Research B.V., Weesp, Netherlands

Filed Sep. 7, 1988, Ser. No. 241,311

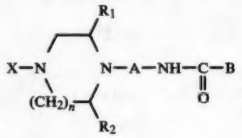
Claims priority, application Netherlands, Sep. 11, 1987, 8702167

Int. Cl.[4] A61K *31/47, 31/50, 31/415, 31/425, 31/495, 31/535*

U.S. Cl. 514—230.5 **2 Claims**

1. A method of treating syndromes in which fear or fear symptoms are involved, characterized in that an anxiolytically effective amount of a compound of the formula:

1.

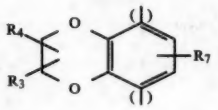


wherein R_1 and R_2 independently of each other are hydrogen or an alkyl having 1 to 3 carbon atoms;

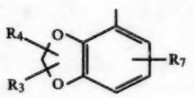
n is 1 or 2;

X is selected from the group consisting of:

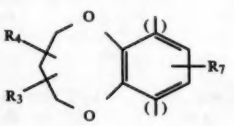
2.



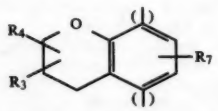
3.



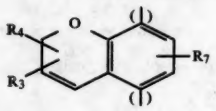
4.

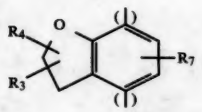


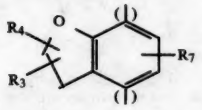
5.

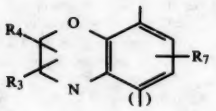


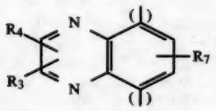
-continued

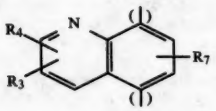


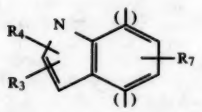


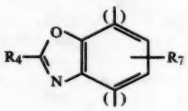


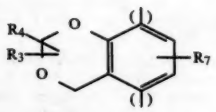




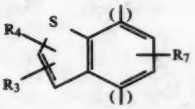


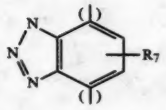


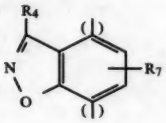


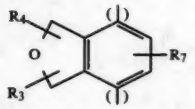


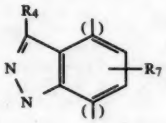
-continued

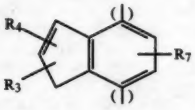
6. 

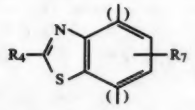
7. 

8. 

9. 

10. 

11. 

12. 

with the proviso that groups of the formulae 2, 5, 6, 9, 10, 11 and 15 may be bonded to the nitrogen atom of the piperazine group via position 5 or 8, the group to formula 4 may be bonded to the nitrogen atom of the piperazine group via position 6 or 9, and the groups of formulae 7, 8, 12, 13, 14 and 16–22 may be bonded to the nitrogen atom of the piperazine group via position 4 or 7, in which R_3 represents hydrogen or straight or branched alkyl having 1 to 3 carbon atoms, R_4 represents hydrogen, halogen, alkyl having 1 to 3 carbon atoms, methylene, ethylidene or vinyl, a straight or branched hydroxyalkyl having 1 to 3 carbon atoms, which may optionally be etherified or esterified, or an alkylcarbonyl having 1 to 3 carbon atoms in the straight or branched alkyl, and an oxo or a phenyl, and R_7 is hydrogen or fluorine;

A is a straight or branched alkylene having 2 to 10 carbon atoms;

B is an aryl or a heteroaryl which may be substituted with one or more substituents selected from the group consisting of: halogen, trifluoromethyl, nitrile, alkoxy having 1 to 3 carbon atoms, hydroxy, esterified hydroxy, or alkyl having 1 to 2 carbon atoms, or wherein B is a straight or branched alkyl group or a saturated or partly unsaturated

cycloalkyl group having 4 carbon atoms, or a pharmaceutically acceptable acid addition salt thereof, is administered to a patient in need thereof.

4,889,853

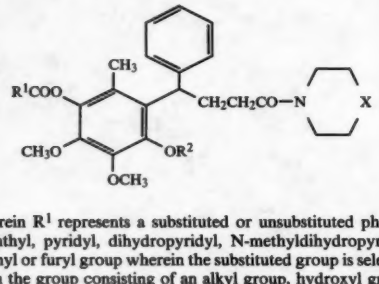
HYDROQUINONLYPHENYL BUTYRIC ACID AMIDE DERIVATIVE

Toshio Tatsuoka, Nishinomiya; Kenji Suzuki, Osaka; Fumio Satoh, Nagaoka; Seiji Miyano, Fukuoka, and Kunihiro Sumoto, Ohnojo, all of Japan, assignors to Suntory Limited, Osaka, Japan

Filed Jul. 8, 1988, Ser. No. 216,337
Claims priority, application Japan, Jul. 9, 1987, 62-169683
Int. Cl.[4] A61K *31/535, 31/54;* C07D *265/30, 279/12*
U.S. Cl. 514—227.5 6 Claims

1. A hydroquinonyl phenylbutyric acid amide derivative having the formula (I):

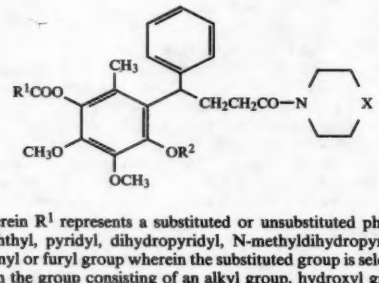
(I)



wherein R^1 represents a substituted or unsubstituted phenyl, naphthyl, pyridyl, dihydropyridyl, N-methyldihydropyridyl, thienyl or furyl group wherein the substituted group is selected from the group consisting of an alkyl group, hydroxyl group, alkoxy group or a halogen atom, R^2 represents a hydrogen atom, or a substituted or unsubstituted acetyl, propionyl, butyryl, benzoyl, napthoyl, furylcarbonyl, thienylcarbonyl, pyridinecarbonyl or dihydropyridinecarbonyl group wherein the substituted group is selected from the group consisting of an alkyl group, hydroxy group, alkoxy group or a halogen atom, and X represents an oxygen atom or sulfur atom pharmaceutically acceptable salt thereof.

6. A pharmaceutical composition having a cerebral insufficiency improving activity, comprising, as an active ingredient, a pharmaceutically effective amount to improve cerebral insufficiency of a hydroquinonylphenyl butyric acid amide derivative having the formula (I):

(I)



wherein R^1 represents a substituted or unsubstituted phenyl, naphthyl, pyridyl, dihydropyridyl, N-methyldihydropyridyl, thienyl or furyl group wherein the substituted group is selected from the group consisting of an alkyl group, hydroxyl group, alkoxy group or a halogen atom, R^2 represents a hydrogen atom, or a substituted or unsubstituted acetyl, propionyl, butyryl, benzoyl, naphthoyl, furylcarbonyl, thienylcarbonyl, pyridinecarbonyl or dihdropyridinecarbonyl group wherein the substituted group is selected from the group consisting of an alkyl group, hydroxy group, alkoxy group or a halogen atom, and X represents an oxygen atom or a sulfur atom or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier therefor.

4,889,854

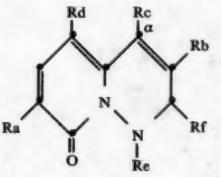
TRICYCLIC PYRIDONE DERIVATIVES

Ulrich Widmer, Rheinfelden, Switzerland, assignor to Hoffman-La Roche Inc., Nutley, N.J.

Filed May 25, 1988, Ser. No. 198,535
Claims priority, application Switzerland, Jun. 12, 1987, 2206/87; Apr. 8, 1988, 1297/88
Int. Cl.[4] A61K *31/50;* C07D *237/26*
U.S. Cl. 514—228.2 32 Claims

1. A compound of the formula

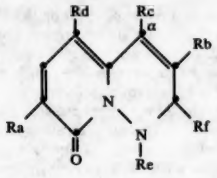
A



wherein Ra is a phenyl, pyridyl or thienyl group which is unsubstituted or substituted by halogen, trifluoromethyl, nitro, lower alkyl or lower alkoxy, Rb and Rc together with the carbon atom denoted by α are a group of the formula $>C_\alpha—CH=CH—CH=CH—$ which is unsubstituted or substituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro, amino or mono- or di(lower alkyl)amino, Rd is the group of the formula $—(A^1)_m—(CO)_n—(Q^1A^2)_q—R^1$, m, n and q each are the number 0 or 1, A^1 is lower alkylene, A^2 is lower alkylene, a direct bond or the group —CO—, Q^1 is an oxygen atom or the group $—NR^2—$, R^1 is hydrogen, hydroxy, cyano, nitro, halogen, lower alkoxy, lower alkyl, lower alkoxycarbonyl, a phenyl group which is unsubstituted or substituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro, amino or mono- or di(lower alkyl)amino, a group of the formula $—NR^3R^4$ or a 5-membered saturated, partially unsaturated or aromatic heterocycle selected from the group consisting of 2-oxazolinyl, 1,2,4 oxadiazolyl, 2-thiazolyl, and 2-tetrahydrofuryl which is attached via a carbon atom and which is unsubstituted or substituted by one or two lower alkyl groups or by a (C_{3-6})-cycloalkyl, hydroxy, lower alkoxy, lower alkanoyloxy, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, lower alkoxycarbonyl, lower alkanoyl, carbamoyl, mono- or di(lower alkyl)carbamoyl, oxo or alkylenedioxy group, R^2 is hydrogen, lower alkyl a phenyl group which is unsubstituted or substituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro, amino or mono- or di(lower alkyl)amino, R^3 and R^4 each, independently, is hydrogen, lower alkyl, lower alkoxyalkyl, lower dialkoxyalkyl, lower alkylenedioxyalkyl, lower cyanoalkyl, lower haloalkyl, lower hydroxyalkyl, lower dihydroxyalkyl, lower alkanoyl, lower alkoxycarbonyl or a cycloalkyl group which is unsubstituted or substituted by hydroxy, lower alkoxy, lower alkanoyloxy, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, oxo, carbamoyl, mono- or di(lower alkyl)-carbamoyl or by lower alkylenedioxy or R^3 and R^4 together with the nitrogen atom are a saturated N-heterocycle selected from the group consisting of 1-azetidinyl, 1-pyrrolidinyl, 1-piperidinyl, 4-morpholinyl, 4-thiomorpholinyl or 4-R^5-piperzinyl which is unsubstituted or substituted by one or two lower alkyl groups or by one or two hydroxy, lower alkoxy, lower alkanoyloxy, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, lower alkoxycarbonyl, lower alkanoyl, carbamoyl, mono- or di(lower alkyl)carbamoyl, oxo or lower alkylenedioxy group, R^5 is hydrogen, lower alkyl, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, lower alkanoyl, lower alkoxycarbonyl, carbamoyl or mono- or di(-lower alkyl)carbamoyl, Re is hydrogen, lower alkyl, lower alkanoyl, phenylcarbonyl, phenyl-(lower alkanoyl), phenyl-(lower alkyl) or lower alkenyl, or a phenylcarbonyl, phenyl-(lower alkanoyl) or phenyl-(lower alkyl) group which is substituted at the phenyl moiety by mono- or di(lower alkyl)amino,

and Rf is hydrogen or lower alkyl, with the proviso that n is the number 0 when q is the number 1 and A^2 is the group —CO—, that R^1 has a significance different from cyano, nitro, halogen or lower alkoxycarbonyl when q is the number 0 and n is the number 1 or when q is the number 1 and A^2 is the group —CO—, and that R^1 has a significance different from hydroxy, cyano, nitro, halogen, lower alkoxycarbonyl, lower alkoxy and $—NR^3R^4$ when q is the number 1 and A^2 is a direct bond, or a pharmaceutically acceptable acid addition salt of compound of formula A which has one or more basic substituents.

13. A pharmaceutical composition comprising an effective amount of a compound of the formula



A

wherein Ra is a phenyl, pyridyl or thienyl group which is unsubstituted or substituted by halogen, trifluoromethyl, nitro, lower alkyl or lower alkoxy, Rb and Rc together with the carbon atom denoted by α are a group of the formula $>C_\alpha—CH=CH—CH=CH—$ which is unsubstituted or substituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro, amino or mono- or di(lower alkyl)amino, Rd is the group of the formula $—(A^1)_m—(CO)_n—(Q^1A^2)_q—R^1$, m, n and q each are the number 0 or 1, A^1 is lower alkylene, A^2 is lower alkylene, a direct bond or the group —CO—, A^1 is an oxygen atom or the group $—NR^2—$, R^1 is hydrogen, hydroxy, cyano, nitro, halogen, lower alkoxy, lower alkyl, lower alkoxycarbonyl, a phenyl group which is unsubstituted or substituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro, amino or mono- or di(lower alkyl)amino, a group of the formula $—NR^3R^4$ or a 5-membered saturated, partially unsaturated or aromatic heterocycle selected from the group consisting of 2-oxazolinyl, 1,2,4-oxadiazolyl, 2-thiazolyl, and 2-tetrahydrofuryl which is attached via a carbon atom and which is unsubstituted or substituted by one or two lower alkyl groups or by a (C_{3-6})-cycloalkyl, hydroxy, lower alkoxy, lower alkanoyloxy, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, lower alkoxycarbonyl, lower alkanoyl, carbamoyl, mono- or di(lower alkyl)carbamoyl, oxo or alkylenedioxy group, R^2 is hydrogen, lower alkyl a phenyl group which is unsubstituted or substituted by halogen, trifluoromethyl, lower alkyl, lower alkoxy, nitro, amino or mono- or di(lower alkyl)amino, R^3 and R^4 each, independently, is hydrogen, lower alkyl, lower alkoxyalkyl, lower dialkoxyalkyl, lower alkylenedioxyalkyl, lower cyanoalkyl, lower haloalkyl, lower hydroxyalkyl, lower dihydroxyalkyl, lower alkanoyl, lower alkoxycarbonyl or a cycloalkyl group which is unsubstituted or substituted by hydroxy, lower alkoxy, lower alkanoyloxy, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, oxo, carbamoyl, mono- or di(lower alkyl)-carbamoyl or by lower alkylenedioxy or R^3 and R^4 together with the nitrogen atom are a saturated N-heterocycle selected from the group consisting of 1-azetidinyl, 1-pyrrolidinyl, 1-piperidinyl, 4-morpholinyl, 4-thiomorpholinyl or 4-R^5-piperzinyl which is unsubstituted or substituted by one or two lower alkyl groups or by one or two hydroxy, lower alkoxy, lower alkanoyloxy, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, lower alkoxycarbonyl, lower alkanoyl, carbamoyl, mono- or di(lower alkyl)carbamoyl, oxo or lower alkylenedioxy group, R^5 is hydrogen, lower alkyl, lower hydroxyalkyl, lower alkoxyalkyl, lower alkanoyloxyalkyl, lower alkanoyl, lower alkoxycarbonyl, carbamoyl or mono- or di(lower alkyl)carbamoyl, Re is hydrogen, lower alkyl, lower alkanoyl, phenylcarbonyl, phenyl-(lower alkanoyl), phenyl(-lower alkyl) or lower alkenyl, or a phenylcarbonyl, phenyl-(lower alkanoyl) or phenyl-(lower alkyl) group which is substituted at the phenyl moiety by mono- or di(lower alkyl)amino, and Rf is hydrogen or lower alkyl, with the proviso that n is the number 0 when q is the number 1 and A^2 is the group —CO—, that R^1 has a significance different from cyano, nitro, halogen or lower alkoxycarbonyl when q is the number 0 and n is the number 1 or when q is the number 1 and A^2 is the group —CO—, and that R^1 has a significance different from hydroxy, cyano, nitro, halogen, lower alkoxycarbonyl, lower alkoxy and $—NR^3R^4$ when q is the number 1 and A^2 is a direct bond, or a pharmaceutically acceptable acid addition salt of compound of formula A which has one or more basic substituents, and an inert carrier material.

4,889,855

HETEROCYCLIC COMPOUNDS AND THEIR PREPARATION AND USE

Poul Jacobsen, Rodovre; Flemming E. Nielsen, Virum, and Tage Honore Malov, all of Denmark, assignors to A/S Ferrosan, Soborg, Denmark

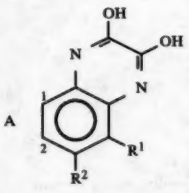
Filed Feb. 16, 1988, Ser. No. 156,539

Claims priority, application Denmark, Mar. 23, 1987, 1467/87

Int. Cl.[4] C07D *487/04, 241/44;* **A61K** *31/495*

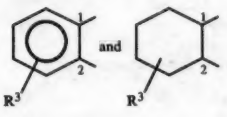
U.S. Cl. 514—250 **12 Claims**

1. A method of treating hyperactivity of the excitatory neurotransmitters, in a subject in need thereof, which comprises the the step of administering to the said subject a neurologically-effective, glutamate antagonistic, amount of a heterocyclic compound having the formula I



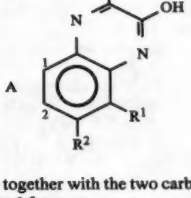
(I)

wherein —A— together with the two carbon atoms denoted as 1 and 2 is selected from



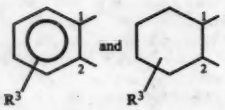
wherein R^1, R^2 and R^3 are independently H, halogen, CN, NH_2, NO_2, SO_3H, SO_2NH_2, or $CONH_2$, or a pharmaceutically-acceptable salt thereof.

6. A pharmaceutical composition comprising as active glutamate antagonistic component an effective amount of a heterocyclic compound having the formula I



(I)

wherein —A— together with the two carbon atoms denoted as 1 and 2 is selected from



wherein R^1, R^2 and R^3 are independently H, halogen, CN, NH_2, NO_2, SO_3H, SO_2NH_2, or $CONH_2$, or a pharmaceutically-acceptable salt thereof, and a solid, sugar, suspending agent, emulsifier, or alcohol pharmaceutically-acceptable carrier or auxiliary agent.

4,889,856

7,8-DIHYDRO-4-(1-PIERAZINYL)-6H-THIOPYRANO-[3,2-D] PYRIMIDINES AS β-BLOCKERS

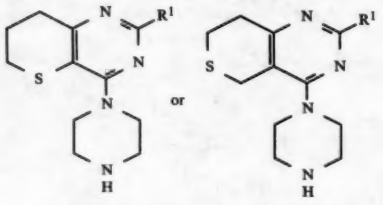
Richard L. Tolman, Warren; Arthur F. Wagner, Princeton, both of N.J.; John J. Baldwin, Gwynedd Valley, and Adolph Pietruszkiewicz, North Wales, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Aug. 31, 1987, Ser. No. 91,471

Int. Cl.[4] C07D *495/04;* A61K *31/505*

U.S. Cl. 514—254 **6 Claims**

1. A compound of structural formula:



or an opthalomologically acceptable salt thereof, wherein:

R^1 is

(1) C_{1-5}alkyl, straight or branched and either unsubstituted or substituted with

(a) cyano,

(b) phenyl-C_{1-5}alkoxy,

(c) phenyl,

(d) C_{1-3}alkoxy,

(2) phenyl, either usubstituted or substituted with one or more of

(a) nitro

(b) halo,

(c) C_{1-3}alkyl or

(d) C_{1-3}alkoxy,

(3) C_{3-6}cycloalkyl.

4,889,857

QUINOLONECARBOXYLIC ACID COMPOUNDS AND PHARMACEUTICAL USE THEREOF

Kazuhiko Araki; Tsuyoshi Kuroda, both of Oita; Satoru Uemori; Akihiko Moriguchi, both of Fukuoka, and Yoshifumi Ikeda, Oita, all of Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

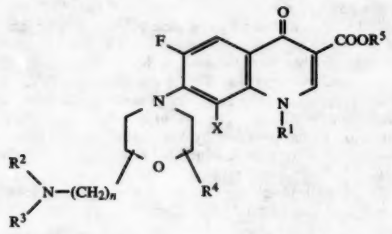
Filed Sep. 29, 1988, Ser. No. 250,634

Claims priority, application Japan, Oct. 12, 1987, 62-256779; Nov. 20, 1987, 62-294759; Jan. 28, 1988, 63-19352; Jun. 3, 1988, 63-137909; Aug. 17, 1988, 63-204004

Int. Cl.[4] A61K *31/535;* C07D *413/04*

U.S. Cl. 514—235.2 **5 Claims**

1. A quinolonecarboxylic acid compound of the formula:



wherein R^1 is an alkyl group, a cycloalkyl group, a haloalkyl group, an alkenyl group, mono- or di-alkylamino groups, a phenyl group or a phenyl group substituted by one to three substituents selected from the group consisting of a halogen atom, an alkyl group, an alkoxy group, a hydroxy group, a nitro group or an amino group, R^2 is a hydrogen atom, an alkyl group, a cycloalkyl group, an acyl group or an alkoxycarbonyl group, R^3 is a hydrogen atom, an alkyl group or an aralkyl group, or R^2 and R^3 together with the adjacent nitrogen atom form a heterocyclic ring, R^4 is a hydrogen atom or an alkyl group, R^5 is a hydrogen atom, an alkyl group, an aralkyl group or an ester residue which is readily hydrolyzable in vivo, X is a hydrogen atom, a halogen atom or an alkyl group, n is an integer of 1 to 3, and a salt thereof.

5. A method of treating various infectious diseases which comprises by administrating an antibacterial effective amount of the compound of claim 1.

4,889,858

DIBENZ[B,E]OXEPIN DERIVATIVES AND PHARMACEUTICAL COMPOSITION CONTAINING THE SAME

Hitoshi Uno, Takatsuki; Mikio Kurokawa; Fuminori Sato, both of Kobe; Shunsuke Naruto, Ikoma, and Yoshinobu Masuda, Katano, all of Japan, assignors to Dainippon Pharmaceutical Co., Ltd., Osaka, Japan

PCT No. PCT/JP87/00392, § 371 Date Feb. 17, 1988, § 102(e) Date Feb. 17, 1988, PCT Pub. No. WO87/07894, PCT Pub. Date Dec. 30, 1987

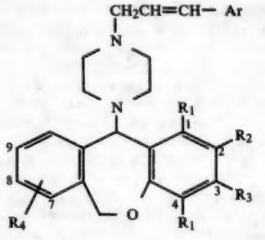
PCT Filed Jun. 17, 1987, Ser. No. 180,104

Claims priority, application Japan, Jun. 17, 1986, 61-142269

Int. Cl.[4] A61K *31/495;* C07D *405/04*

U.S. Cl. 514—254 **11 Claims**

1. A compound represented by the general formula (I):



(I)

wherein R_1 is hydrogen atom or methoxy group, R_2 is hydrogen atom, methoxy group, hydroxy group or fluorine atom, R_3 is hydrogen atom or fluorine atom, R_4 is hydrogen atom or fluorine atom at 7-, 8- or 9-position, and Ar is a benzene ring, a thiophene ring or a pyridine ring, provided that (i) at least two of R_1, R_2, R_3 and R_4 are hydrogen atoms, (ii) R_2 or R_3 is fluorine atom when R_4 is fluorine atom, (iii) R_1, R_3 and R_4 are hydrogen atoms when R_2 is methoxy group or hydroxy group, (iv) R_2 and R_3 are not simultaneously fluorine atoms, and (v)

R_2 is hydrogen atom or fluorine atom, R_3 is hydrogen atom or fluorine atom, and both R_1 and R_4 are hydrogen atoms when Ar is a thiophene ring or a pyridine ring, or a physiologically acceptable acid addition salt thereof.

11. A method for treatment of cerebral diseases caused by hypoxia in mammals, which comprises administering to said mammals an anti-cerebral hypoxia effective amount of 11-(4-cinnamyl-1-piperazinyl)-3-fluoro-6,11-dihydrodibenz[b,e] -oxepin, or a physiologically acceptable acid addition salt thereof.

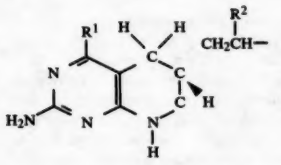
4,889,859

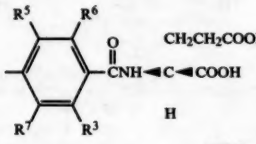
PYRIDO[2,3-D]PYRIMIDINE DERIVATIVES

Edward C. Taylor, Princeton, N.J., and Chuan Shih, Indianapolis, Ind., assignors to The Trustees of Princeton University, Princeton, N.J.

Filed Feb. 5, 1988, Ser. No. 156,908
Int. Cl.[4] A61K *31/505;* **C07D** *471/04*
U.S. Cl. 514—258 **14 Claims**

1. A compound selected from the group consisting of (i) a tetrahydro[2,3-d]pyrimidine the formula:





wherein R^1 is hydroxy or amino;
R^2 is hydrogen, methyl, or ethyl;
one or two members of R^3, R^5, R^6, and R^7 are selected from the group consisting of chloro and fluoro and the remaining members of R^3, R^5, R^6, and R^7 are hydrogen;
(ii) the pharmaceutically acceptable salts thereof; and
(iii) diastereoisomeric mixtures of said tetrahydro[2,3-d]pyrimidines or their salts.

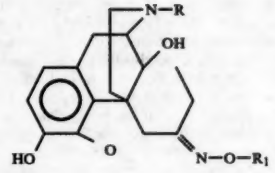
4,889,860

OXIMES OF OXYMORPHONE, NALTREXONE AND NALOXONE AS POTENT, SELECTIVE OPIOID RECEPTOR AGONISTS AND ANTAGONISTS

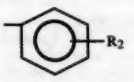
Waclaw J. Rzeszotarski, Millersville, and Babu J. Mavunkel, Baltimore, both of Md., assignors to Nova Pharmaceutical Corporation, Baltimore, Md.

Continuation-in-part of Ser. No. 778,800, Sep. 23, 1985, Pat. No. 4,760,069. This application Apr. 6, 1987, Ser. No. 35,034
The portion of the term of this patent subsequent to Jul. 26, 2005, has been disclaimed.
Int. Cl.[4] A61K *31/485;* **C07D** *489/08*
U.S. Cl. 514—282 **22 Claims**

1. A potent, selective opioid kappa receptor agonist or a delta or mu antagonist compound of the formula:



wherein R is cyclopropylmethyl and R_1 is selected from the group consisting of phenylethyl, naphthyl, tetrahydronaphthyl, phenylpropyl, cyclohexyl, cyclopentyl, iminoaminomethylphenyl, dimethylphenyl, t-butyl, trifluormethylphenyl, cyanophenyl, 4-benzimidazolyl, 5-benzimidazolyl, or



wherein R_2 is selected from the group consisting of hydrogen, halogen, hydroxy, nitro, methoxy, methyl, trifluormethyl or amino and the pharmaceutically acceptable salts thereof.

4. A pharmaceutial composition for relieving pain which comprises a pain relieving effective amount of one or more compounds of claim **1** with a pharmaceutically acceptable carrier and/or diluent.

5. A process of relieving pain in an animal in need thereof which comprises administering said compound of claim **1** or **15** parenterally, nasally, orally, rectally or a combination thereof to said animal in need thereof.

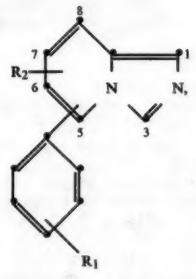
4,889,861

SUBSTITUTED IMIDAZO[1,5-A]PYRIDINE DERIVATIVES AND OTHER SUBSTITUTED BICYCLIC DERIVATIVES AND THEIR USE AS AROMATASE INHIBITORS

Leslie J. Browne, Morris Plains, N.J., assignor to Ciba-Geigy Corp., Ardsley, N.Y.

Division of Ser. No. 825,830, Feb. 4, 1986, Pat. No. 4,728,645, which is a continuation of Ser. No. 747,195, Jun. 20, 1985, abandoned, which is a continuation-in-part of Ser. No. 622,421, Jun. 20, 1984, Pat. No. 4,617,307, and a continuation-in-part of Ser. No. 451,902, Dec. 21, 1982, Pat. No. 4,588,732. This application Nov. 13, 1987, Ser. No. 120,283
The portion of the term of this patent subsequent to Oct. 25, 2006, has been disclaimed.
Int. Cl.[4] A61K *31/395, 31/495;* **C07D** *471/04, 417/00*
U.S. Cl. 514—300 **25 Claims**

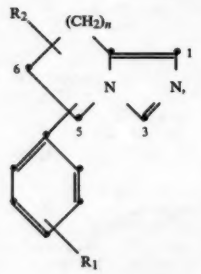
1. A compound of the formula



(I)

wherein R_1 represents hydrogen; lower alkyl; lower alkyl substituted by hydroxy, lower alkoxy, lower alkanoyloxy,

lower alkanoyl, amino, lower alkylamino or di-lower alkylamino, halogen, sulfo, sulfamoyl, carboxy, lower alkoxycarbonyl, carbamoyl or cyano; nitro, halogen, hydroxy, lower alkoxy, aryloxy, aryl-lower alkoxy, lower alkanoyloxy, aroyloxy, lower alkoxycarbonyloxy, mercapto, lower alkylthio, arylthio, aryl-lower alkylthio, aryl-sulfinyl, aryl-sulfonyl, lower alkylsulfinyl, lower alkylsulfonyl, lower alkanoylthio, amino, lower alkylamino, arylamino, aryl-lower alkylamino, lower alkanoylamino, aroylamino, di-lower alkylamino; pyrrolidino, piperidino, morpholino, thiomorpholino or optionally 4-lower alkylsubstituted piperazino; quaternary ammonium derived from a disubstituted amino group mentioned above which contains as quaternary substituent lower alkyl, hydroxy- or halo-lower alkyl or aryl-lower alkyl; sulfo, lower alkoxysulfonyl, sulfamoyl, lower alkylsulfamoyl, di-lower alkylsulfamoyl, formyl or formyl as a di-lower alkyl acetal derivative; iminomethyl which may be N-substituted by hydroxy, lower alkoxy, lower alkanoyloxy, lower alkyl, aryl or amino; C_2–C_{20}- alkanoyl, halo-C_2–C_7-alkanoyl, aroyl, cyano, carboxy, lower alkoxycarbonyl, carbamoyl, lower alkylcarbamoyl, di-lower alkylcarbamoyl or hydroxycarbamoyl; R_2 represents hydrogen, lower alkyl; lower alkyl substituted by aryl, carboxy or lower alkoxycarbonyl; hydroxy, lower alkoxy, aryloxy, aryl-lower alkoxy, lower alkanoyloxy, aroyloxy, lower alkoxycarbonyloxy, mercapto, lower alkylthio, arylthio, aryl-lower alkylthio, aryl-sulfinyl, aryl-sulfonyl, lower alkylsulfinyl, lower alkylsulfonyl, lower alkanoylthio, C_2–C_{20}-alkanoyl, halo-C_2–C_7-alkanoyl, aroyl, cyano, carboxy, lower alkoxycarbonyl, carbamoyl, lower alkyl-carbamoyl, di-lower alkylcarbamoyl or hydroxycarbamoyl; aroyl within said definitions represents arylcarbonyl; and aryl within any of the above definitions represents 1- or 2-naphthyl, phenyl, or phenyl substituted by lower alkyl, lower alkoxy or halogen; a 7,8-dihydro derivative thereof; or a compound of the formula I*



(I*)

wherein n denotes 2; and R_1 and R_2 are as defined above under formula I; or a pharmaceutically acceptable salt of any said compound.

18. A method of suppressing ovarian estrogen content in mammals which comprises administering to a said mammal in need thereof an effective amount of a compound according to claim 1 or of a pharmaceutical composition comprising a said compound together with one or more pharmaceutically acceptable carriers.

4,889,862

FREEZE-DRIED PHARMACEUTICAL COMPOSITIONS OF PHENYLQUINOLINE CARBOXYLIC ACIDS

Chien-Chin Wu, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 901,254, Aug. 28, 1986, abandoned. This application Jun. 10, 1987, Ser. No. 60,203

Int. Cl.[4] **A61K** *31/47, 47/00*

U.S. Cl. 514—311 **10 Claims**

1. A powder pharmaceutical composition suitable for reconstitution into an injectable solution for intravenous or intraperitoneal use, consisting essentially of a freeze-dried mixture of (a) a sodium or potassium salt of a phenylquinoliine carboxylic acid useful as an anti-tumor agent, and (b) a stabilization system consisting essentially of (1) a bile salt and (2) a pharmaceutically acceptable base or buffer that will give a pH in the range of 8.5–11 upon aqueous reconstitution, the weight ratio of (a) to (b)(1) being at least about 1:0.1.

4,889,863

NEW THIAZOLE COMPOUNDS HAVING FUNGICIDAL ACTIVITY

Hendrik Dolman, and Johannes Kuipers, both of Weesp, Netherlands, assignors to Duphar International Research B.V., Weesp, Netherlands

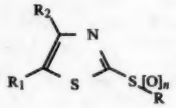
Filed Jul. 22, 1988, Ser. No. 222,907

Claims priority, application Netherlands, Jul. 27, 1987, 8701764

Int. Cl.[4] **C07D** *277/36, 277/56;* **A01N** *43/78*

U.S. Cl. 514—312 **9 Claims**

1. Thiazole compounds of the general formula



(I)

wherein

R is C_1–C_{12} alkyl group or a phenyl group;

R_1 is a cyano group, a formyl group, an alkylcarbonyl group having 2–5 carbon atoms, or a benzoyl group;

R_2 is a hydrogen atom; a halogen atom; an amino group; an amino group substituted with 1 or 2 substituents selected from the group consisting of C_1–C_4 alkyl, C_2–C_5 alkynyl, C_2–C_5 alkylcarbonyl and C_2–C_5 alkoxycarbonyl; an alkoxy group having 1–4 carbon atoms; or an aryloxy or arylsulphonyl group, wherein the aryl group is selected from phenyl and quinolyl; and n is 1 or 2.

4,889,864

CARBAMOYLIMIDAZOLE DERIVATIVES AND THEIR USE AS FUNGICIDES

Heinz Ehrhardt, Rehling; Hilmar Mildenberger, Kelkheim; Thomas Maier, Frankfurt am Main; Rainer Schaller, Gersthofen; Burkhard Sachse, Kelkheim, and Peter Braun, Mainz, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

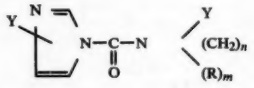
Filed Dec. 1, 1987, Ser. No. 127,065

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1986, 3641343

Int. Cl.[4] **C07D** *401/06, 403/06;* **A01N** *43/50*

U.S. Cl. 514—326 **6 Claims**

1. A compound of formula I



(I)

in which

n is 2, 3, 4, 5 or 6,

m is 1 or 2,

R is

$$-OR^1,\ -\underset{\displaystyle R^2}{\overset{\displaystyle |}{CHO}}-R^1,\ -\underset{\displaystyle R^2}{\overset{\displaystyle |}{CH}}-SR^1,\ -CH_2\underset{\displaystyle R^2}{\overset{\displaystyle |}{CHOR^1}},\ \text{or}$$

$$-CH_2CH_2CH_2OR^1,$$

R^1 is (C_1–C_{10})-alkyl or (C_3–C_{10})-alkenyl, each of which is

unsubstituted or substituted by 1 to 6 fluorine, chlorine or bromine atoms, hydroxyl, (C_1–C_4)-alkoxy, phenyl or phenoxy, where the latter two are unsubstituted or substituted by halogen, (C_1–C_4)alkyl or (C_1–C_4)alkoxy; or is C_3-alkynyl, (C_3–C_6)-cycloalkyl, (C_5–C_6)-cycloalkenyl, phenyl, benzyl, benzohydryl, trityl, biphenyl, phenoxyphenyl, phenylthiophenyl, naphthyl, 1,2,3,4-tetrahydronaphthyl, indanyl, fluorenyl, pyridyl, benzothiazolyl, benzoxazolyl, quinolinyl, thiochromanyl, benzofuranylmethyl, quinolinylmethyl or phenacyl, where the ring systems mentioned are unsubstituted or substituted by 1–5 substitutents selected from the group consisting of halogen, (C_1–C_8)-alkyl, halo(C_1–C_8)-alkyl, (C_3–C_8)-cycloalkyl, (C_1–C_8-alkoxy, halo-(C_1–C_8)alkoxy, (C_3–C_8)-cycloalkyl(C_1–C_4)alkyl, (C_1–C_8)alkylthio, halo(C_1–C_4)alkylthio, (C_1–C_8)-alkylsulfinyl, (C_1–C_8)alkylsulfonyl, NO_2, —CN, —CHO and (C_1–C_4)alkylcarbonyl; or is (C_4–C_{10})-alkadienyl,

R^2 is hydrogen or (C_1–C_4)alkyl, and

Y is hydrogen, (C_1–C_4)alkyl, phenyl or halophenyl where the Y substituents shown in formula (I) are the same or different, and metal-salt complexes thereof.

6. A process for combatting harmful fungi which comprises applying an effective amount of a compound as claimed in claim 1 to said harmful fungi, to a plant in need of protection from said harmful fungi, to a cultivated area of said plant or to a substrate.

4,889,865

10-ARYL-1,8-DIHYDROXY-9- ANTHRONES AND THEIR ESTERS

Braham Shroot, Villa 35, Hameaux de Val-Bosquet, Chemin de Val-Bosquet, Antibes 06600; Gérard Lang, 44, avenue Lacour, 95210 Saint Gratien; Jean Maignan, 8, rue Halévy, 93290 Tremblay les Gonesse; Serge Restlé , 140, rue Anatole France, 93600 Aulnay-sous-Bois; Christopher Hensby, 89, Chemin d'Andon, Villa Madru, 06410 Biot, and Michel Colin, 10, Allée Cécile, 93190 Livry-Gargan, all of France

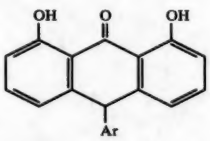
Division of Ser. No. 176,974, Apr. 4, 1988, Pat. No. 4,843,097, which is a continuation-in-part of Ser. No. 744,240, Jun. 13, 1985, abandoned, and a continuation-in-part of Ser. No. 940,068, Dec. 10, 1986, abandoned. This application Feb. 21, 1989, Ser. No. 312,945

Claims priority, application France, Jun. 13, 1984, 84 09203; Dec. 11, 1985, 85 18338

Int. Cl.[4] A61K *31/12, 7/13*

U.S. Cl. 514—332 **3 Claims**

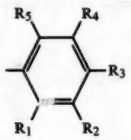
1. A 10-aryl-1,8-dihydroxy anthrone having the formula



(I)

wherein

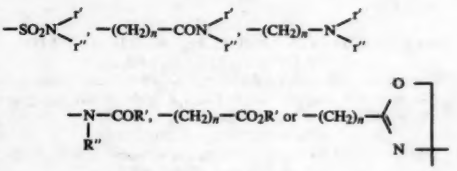
Ar represents an aromatic radical having a formula selected from



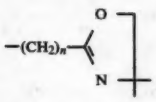
(i)

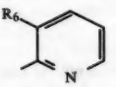
wherein

R_1, R_2, R_3, R_4 and R_5, each independently, represent hydrogen, halogen, —CF_3, hydroxyl, lower alkyl, lower cycloalkyl, lower hydroxyalkyl, lower alkoxy, nitrile,



wherein r' and r'', each independently, represent hydrogen or lower alkyl, n equals 0 or a whole number ranging from 1 to 3 inclusive; R' and R'' represent hydrogen, linear or branched lower alkyl, or aryl, with the proviso that at least one of R_1–R_5 is





(ii)

(iii)

wherein R_6 represents one of the meanings given for R_1–R_5 and,

(iv)

4,889,866

ARYLSULFONYL DIHYDROPYRIDINE DERIVATIVES

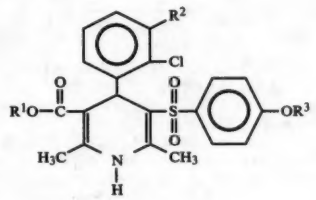
Jurg R. Pfister, Los Altos; Roman Davis, Campbell, and Chi-Ho Lee, Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Jun. 11, 1987, Ser. No. 61,752

Int. Cl.[4] C07D *211/96;* A61K *31/44*

U.S. Cl. 514—347 **10 Claims**

1. A compound as a single stereoisomer, or a mixture thereof, of the formula:



wherein

R^1 is hydrogen or lower alkyl;

R^2 is hydrogen or chloro; and

R^3 is hydrogen, or a pharmaceutically acceptable salt thereof.

4,889,867

PHOTOACTIVATED MITICIDAL AND INSECTICIDAL ETHYNYL-THIAZOLES

Kathryn A. Lutomski, Hightstown; David M. Roush, Princeton, both of N.J., and Richard B. Phillips, Irvine, Calif., assignors to FMC Corporation, Philadelphia, Pa.

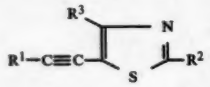
Filed Nov. 15, 1988, Ser. No. 271,809

The portion of the term of this patent subsequent to Nov. 29, 2005, has been disclaimed.

Int. Cl.[4] A01N *43/78*; C07D *417/06, 277/22*

U.S. Cl. 514—365 **3 Claims**

1. A photoactive acaricidal ethynylthiazole of the formula



I

in which:

R^1 is naphthyl; phenyl; phenyl substituted with at least one substituent selected from lower alkyl, halogen, lower alkoxy, lower haloalkoxy, lower alkylthio, lower haloalkylthio, phenylthio, nitro, cyano, lower alkylcarbonyl, lower haloalkylcarbonyl, lower alkoxycarbonyl, phenoxycarbonyl in which the phenyl ring may be substituted with lower alkyl or halogen, a group of the formula $—C(X)NR^4R^5$ in which R^4 and R^5 are independently hydrogen, lower alkyl or phenyl and X is oxygen or sulfur, a group of the formula $—P(O)(OR^6)_2$ in which R^6 is lower alkyl, and a group of the formula $—OCF_2O—$ bridging adjacent atoms of the phenyl ring; thienyl; or thienyl substituted with at least one substituent selected from halogen, lower haloalkyl, lower alkylthio, lower haloalkylthio, phenylthio, lower alkylcarbonyl, lower haloalkylcarbonyl, lower alkoxycarbonyl, phenoxycarbonyl in which the phenyl ring may be substituted with lower alkyl or halogen, a group of the formula $—C(X)NR^4R^5$ in which R^4 or R^5 and X are as defined above, and a group of the formula $—P(O)(OR^6)$ in which R^6 is lower alkyl;

R^2 is naphthyl; phenyl; or phenyl substituted with at least one substituent selected from lower alkyl, halogen, lower haloalkyl, $—OCF_2O—$ bridging adjacent carbon atoms of the phenyl ring, lower alkoxy, lower haloalkoxy, lower alkylthio, lower haloalkylthio, phenylthio, nitro, cyano, lower alkylcarbonyl, lower haloalkylcarbonyl, lower alkoxycarbonylcarbonyl, phenoxycarbonyl in which the phenyl ring may be substituted with lower alkyl or halogen, a group of the formula $—C(X)NR^4R^5$ in which R^4 and R^5 and X are as defined above, and a group of the formula $—P(O)(OR^6)_2$ in which R^6 is lower alkyl; and

R^3 is hydrogen, lower alkyl, phenyl, or methylphenyl.

4,889,868

BIS-IMIDAZOLINOAMINO DERIVATIVES AS ANTIALLERGY COMPOUNDS

Fu-chih Huang, Leonia, N.J., assignor to Rorer Pharmaceutical Corporation, Fort Washington, Pa.

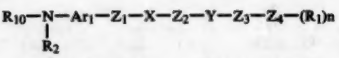
Continuation-in-part of Ser. No. 684,214, Dec. 20, 1984, Pat. No. 4,588,737. This application Dec. 16, 1985, Ser. No. 809,649

The portion of the term of this patent subsequent to May 13, 2003, has been disclaimed.

Int. Cl.[4] A61K *31/415*; C07D *405/12, 405/14*

U.S. Cl. 514—392 **47 Claims**

1. A compound of the formula:



or a pharmaceutically acceptable salt thereof; wherein

Ar_1 is phenyl or naphthyl;

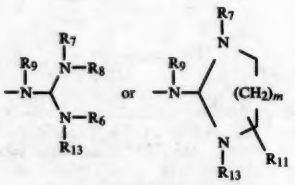
X and Y are independently O, S or a chemical bond;

Z_1 and Z_3 are each a chemical bond or alkylene chain having up to 8 carbon atoms in the principal chain and up to a total of 12 carbon atoms;

Z_2 and Z_4 are each a chemical bond, alkylene chain having up to 6 carbon atoms in the principal chain and a total of up to 10 carbon atoms, carbocyclic aryl, cycloalkyl, or tetrahydrofuran;

each of Z_1, Z_2, Z_3 and Z_4 is substituted or unsubstituted;

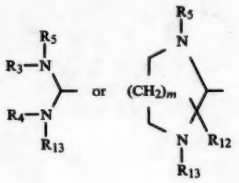
each R_1 is independently hydrogen, lower alkyl, carbocyclic aryl, lower carbocyclic aralkyl, hydroxy, lower alkoxy, carboxy, lower carbocyclic carbaralkoxy, lower carbocyclic carbaryloxy, lower alkoxy carbonyl, lower alkanoyl, cyano, halogen, amino, lower alkenyl, lower alkynyl, lower cycloalkyl,



R_2, R_5, R_7, R_9 and R_{13} are independently hydrogen, lower alkyl or lower alkanoyl; but when the nitrogen to which R_2 is attached contains a double bond, then R_2 is a bond and becomes part of the double bond, when the nitrogen to which R_9 is attached contains a double bond, then R_9 is a bond and becomes part of the double bond, or when the nitrogen to which R_{13} is attached contains a double bond, then R_{13} is a bond and becomes part of the double bond;

R_3, R_4, R_6 and R_8 are independently hydrogen, lower alkyl, cyano, or nitro;

R_{10} is



R_{11} and R_{12} are independently hydrogen, or lower alkyl;

n is 0, 1, 2, or 3 and

m is 0;

provided that (1) when Z_2 is a chemical bond or methylene group, X and Y cannot be both oxygen or sulfur and (2) at least one of R_1 and R_{10} contains an imidazolino group.

47. A method of treating asthma or inflammatory or allergic conditions in a mammal comprising the administration of a therapeutically effective amount of a compound according to claim 1.

4,889,869

ANTIHYPERTENSIVE 5-AMINO-4-HYDROXYVALERYL DERIVATIVES SUBSTITUTED BY SULPHUR-CONTAINING GROUPS

Peter Bühlmayer, Arlesheim, Switzerland; James L. Stanton, Lebanon, N.J.; Walter Fuhrer, Lupsingen, Switzerland; Richard Göschke, Bottmingen, Switzerland; Vittorio Rasetti, Basel, Switzerland, and Heinrich Rüeger, Oberwil, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

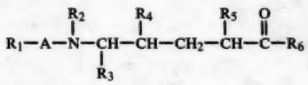
Continuation of Ser. No. 187,608, Apr. 28, 1988, abandoned, which is a division of Ser. No. 11,183, Feb. 5, 1987, Pat. No. 4,758,584. This application Apr. 19, 1989, Ser. No. 341,239

Claims priority, application Switzerland, Feb. 7, 1986, 486/86; Aug. 20, 1986, 3347/86

Int. Cl.[4] A61K *37/64;* C07K *5/08*

U.S. Cl. 514—400 9 Claims

1. A compound of the formula

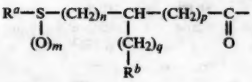


(I)

wherein

A is histidyl;

R_1 is of the formula



(Ia)

in which

R^a is lower alkyl which is unsubstituted or substituted by hydroxy, lower alkoxy, lower alkanoyloxy, halogen, amino, lower alkylamino, dilower alkylamino, or by lower alkoxycarbonylamino; m is 0, 1 or 2; n is 0 or 1; p is 0; q is 1 or 2; and R^b is phenyl which is unsubstituted or substituted by at least one substituent selected from lower alkyl, hydroxy, lower alkoxy, lower alkanoyloxy, amino, lower alkylamino, dilower alkylamino, t-butoxycarbonylamino, and halogen;

R_2 is hydrogen or lower alkyl;

R_3 is cyclo lower alkyl-lower alkyl;

R_4 is (a) hydroxy, (b) hydroxy etherified by an organic radical that can be removed under physiological conditions and the cleavage products of which are physiologically tolerable in the resulting concentration, or c) hydroxy esterified by lower alkanoyl, cyclo lower alkylcarbonyl, or benzoyl;

R_5 is lower alkoxy, lower alkylthio or lower alkylsulphonyl; and R_6 is alkylamino having 1–10 carbon atoms or dilower alkylamino; or a pharmaceutically acceptable salt thereof.

9. A method of treating a warm-blooded animal suffering from renin-associated hyperaldosteronism, hypertension or cardiac insufficiency by administering to said animal a therapeutically effective amount of a compound or a pharmaceutically acceptable salt thereof according to claim 1.

4,889,870

2-(2,2-DIFLUOROCYCLOPROPYL)ALKYL ESTERS, PROCESSES FOR THEIR PREPARATION AND THEIR USE AS INSECTICIDES AND ACARICIDES

Peter Wegner; Hans-Rudolf Krüger; Dietrich Baumert, and Hartmut Joppien, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Fed. Rep. of Germany

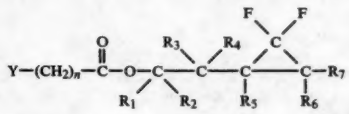
Filed Jan. 29, 1988, Ser. No. 149,732

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1987, 3703212

Int. Cl.[4] A61K *31/325, 31/34;* C07C *69/24;* C07D *307/45*

U.S. Cl. 514—429 18 Claims

1. 2-(2,2-Difluorocyclopropyl)alkyl esters of general formula I



(I)

in which

Y is an aryl group, unsubstituted or substituted, one or more times, by C_{1-6}-alkyl, halo-C_{1-6}-alkyl, phenyl-C_{1-6}-alkyl, C_{2-6}-alkenyl, halo-C_{2-6}-alkenyl, phenyl-C_{2-6}-alkenyl, C_{2-6}-alkynyl, halo-C_{2-6}-alkynyl, phenyl-C_{2-6}-alkynyl, C_{1-16}-alkoxy, halo-C_{1-6}-alkoxy, phenyl-C_{1-6}-alkoxy, C_{3-10}-cycloalkoxy, halo-C_{3-10}-cycloalkoxy, phenyl-C_{3-10}-cycloalkoxy, C_{3-6}-cycloalkylalkoxy, halo-C_{3-6}-cycloalkylalkoxy, phenyl-C_{3-6}-cycloalkylalkoxy, C_{2-6}-alkenyloxy, halo-C_{2-6}-alkenyloxy, phenyl-C_{2-6}-alkenyloxy, C_{2-6}-alkynyloxy, halo-C_{2-6}-alkynyloxy, phenyl-C_{2-6}-alkynyloxy, alkylsulphonyloxy, haloalkylsulphonyloxy, arylsulphonyloxy, phenyl, halogen, amino, cyano, hydroxy, nitro, aryloxy, haloaryloxy, C_{1-6}-alkylaryloxy, nitroaryloxy, arylamino, haloarylamino, C_{1-6}-alkylarylamino, aryl-N-C_{1-6}-alkylamino, C_{1-6}-alkoxycarbonyl, halo-C_{1-6}-alkoxycarbonyl, phenyl-C_{1-6}-alkoxycarbonyl, C_{3-10}-cycloalkoxycarbonyl, halo-C_{3-6}-cycloalkoxycarbonyl, C_{3-6}-cycloalkylalkoxycarbonyl, halo-C_{3-6}-cycloalkoxycarbonyl, phenyl-C_{3-6}-cycloalkylalkoxycarbonyl, phenyl-C_{3-6}-cycloalkylalkoxycarbonyl, C_{1-2}-alkyldioxy, alkyl-C_{3-10}-cycloalkoxy, C_{1-6}-alkylthio, halo-C_{3-6}-cycloalkylalkylamino, C_{1-6}-alkylamino, di-C_{1-6}-alkylamino, N-pyrrolyl, the group $COOR_8$ (R_8 is hydrogen or a metal atom) or $N(R_9)_3X$ (R_9 is hydrogen or C_{1-6}-alkyl and X is halo),

R_1, R_2, R_3, R_4, R_5, R_6 and R_7 are the same or different and are hydrogen, C_{1-6}-alkyl, halo-C_{1-6}-alkyl, phenyl or halophenyl and

n is 0 or 1.

3. An insecticidal and acaricidal composition which comprises a compound claimed in claim 1, in admixture with an agriculturally acceptable diluent or carrier.

4,889,871

ALKOXY-SUBSTITUTED DIHYDROBENZOPYRAN-2-CARBOXYLATE DERIVATIVES

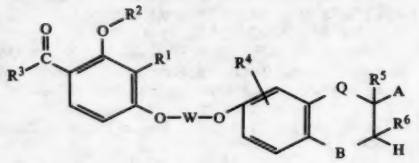
Stevan W. Djuric, Glenview; Robert L. Shone, Palatine, and Stella S. T. Yu, Morton Grove, all of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Continuation-in-part of Ser. No. 57,136, May 29, 1987, abandoned. This application May 12, 1988, Ser. No. 188,708

Int. Cl.[4] A61K *31/35;* C07D *311/66, 311/58*

U.S. Cl. 514—456 28 Claims

1. A compound of the formula:



or a pharmaceutically acceptable salt thereof wherein

R^1 represents alkyl having 2–6 carbon atoms, alkenyl having 2 to 6 carbon atoms, alkynyl having 2 to 6 carbon atoms, or $(CH_2)_nR$ wherein R represents cycloalkyl of 3 to 5 carbon atoms l n is 1 or 2;

R^2 represents methyl or ethyl;

R^3 represents alkyl having 1 to 5 carbon atoms;

W represents $(CH_2)_x$ where x is 2 to 7, alkenylene having 3 to 7 carbon atoms, alkynylene having 3 to 7 carbon atoms, or cyclopentyl;

R^4 represents hydrogen, alkyl having 2 to 5 carbon atoms, alkenyl having 2 to 5 carbon atoms, or alkynyl having 2 to 5 carbon atoms;

Q represents oxygen;

B represents CH_2;

R^5 represents hydrogen, alkyl having 1 to 6 carbon atoms, or R^5 represents alkanoyl having 2 to 4 carbon atoms, or $(CH_2)Y—CO_2R^8$ wherein Y is 0 to 4 and R^8 is hydrogen or alkyl having 1 to 6 carbon atoms;

R^6 represents hydrogen; and

A represents $—Z—CO_2R^7$ wherein R^7 represents hydrogen or alkyl having 1 to 6 carbon atoms, and wherein Z is absent or represents straight or branched chain alkylene or alkenylene having up to 6 carbon atoms.

11. A method of treating inflammatory diseases characterized by the production of leukotriene B_4, comprising administering to a mammal in need of anti-inflammatory treatment a therapeutically effective anti-inflammatory amount of a compound of claim **1**.

4,889,872

2,3,5,6-TETRAFLUOROBENZYL (+) 1R-TRANS-2,2-DIMETHYL-3-(2,2-DICHLOROVINYL)-CYCLOPROPANECARBOXYLATE

Klaus Naumann, Leverkusen, and Wolfgang Behrenz, Overath, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

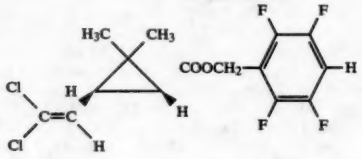
Filed Feb. 11, 1988, Ser. No. 154,813

Claims priority, application Fed. Rep. of Germany, Feb. 19, 1987, 3705224

Int. Cl.[4] **C07C** *69/743;* **A01N** *53/00*

U.S. Cl. 514—531 **11 Claims**

1. 2,3,5,6-Tetrafluorobenzyl (+)1R-trans-2,2-dimethyl-3-(2,2-dichlorovinyl)-cyclopropanecarboxylate of the formula



free of optical isomers.

4,889,873

INHIBITORS OF SLOW REACTING SUBSTANCE OF ANAPHYLAXIS

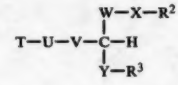
Anil K. Saksena, Upper Montclair; Jesse K. Wong, Union, both of N.J., and Pietro Mangiaracina, Monsey, N.Y., assignors to Schering Corporation, Kenilworth, N.J.

Division of Ser. No. 866,996, May 19, 1986, Pat. No. 4,758,594, which is a continuation of Ser. No. 632,143, Jul. 18, 1984, abandoned. This application Nov. 17, 1987, Ser. No. 121,557

Int. Cl.[4] **A61K** *31/22;* **C07C** *143/90*

U.S. Cl. 514—560 **7 Claims**

1. A compound having the structural formula II or a pharmaceutically acceptable salt thereof,



II

wherein

T is a straight or branched chain alkyl having from 7–15 carbon atoms which may optionally contain from 1–3 non-cumulative double or triple bonds;

U is —C≡C—;

V is a straight or branched chain alkylene having from 1 to 4 carbon atoms or is a direct bond;

W represents O or $S(O)_m$ wherein m is 0, 1 or 2;

X is a straight or branched chain alkylene having from 2 to 12 carbon atoms which may optionally contain from 1 to 3 non-cumulative double or triple bonds and which may be optionally substituted with a group $—NHR^a$ {wherein R^a is hydrogen, alkyl having from 1 to 6 carbon atoms, $COCF_3$, $CO(CH_2)_2CH(NH_2)CO_2H$, or SO_2R^b and wherein R^b is alkyl having from 1 to 6 carbon atoms or CF_3};

Y represents straight or branched chain alkylene having from 1 to 12 carbon atoms which is substituted with the group OR^c {wherein R^c is hydrogen, carboxylic acyl having from 1 to 6 carbon atoms, tetrahydropyran-2-yl, or $COCH_2CH_2CO_2H$} and may optionally contain from 1 to 3 non-cumulative double or triple bonds; and

R^2 and R^3 may be the same or different and are independently selected from CH_2OR^c {wherein R^c is hydrogen, carboxylic acyl having from 1 to 6 carbon atoms, tetrahydropyran-2-yl or $COCH_2CH_2CO_2H$}, CHO, COR^d {wherein R^d is hydroxy, alkoxy having from 1 to 6 carbon atoms, $OCH_2OC(O)C(CH_3)_3$, or NHR^e and wherein R^e is hydrogen, alkyl having from 1 to 6 carbon atoms or CH_2CO_2H} or SO_3H, with the proviso that at least one of R^2 and R^3 is carboxyl.

5. A method for treating allergic reactions in a mammal which comprises administering an anti-allergic effective amount of a compound of formula II as defined in claim **1** to said mammal.

4,889,874

HYDROXAMIC ACID DERIVATIVES AND METHOD OF USING SAME

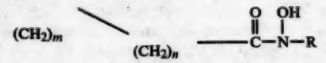
Martin F. Haslanger, Ridgewood, and Eric M. Gordon, Pennington, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation of Ser. No. 883,227, Jul. 7, 1986, abandoned. This application Mar. 14, 1988, Ser. No. 183,406

Int. Cl.[4] **C07C** *83/10;* **A61K** *73/185*

U.S. Cl. 514—575 **11 Claims**

1. A pharmaceutical composition for inhibiting allergic conditions in a mammalian species comprising a pharmaceutically acceptable carrier and an effective amount of a compound of the formula



wherein

$(CH_2)_n$ and $(CH_2)_m$

are cycloalkyl groups which may be the same or different, where m is an integer from 3 to 8 and n is an integer from 3 to 8; and

R is H, lower alkyl, substituted alkyl including aralkyl, aryl, substituted aryl, lower alkenyl, or cycloalkyl;

including pharmaceutically acceptable salts thereof.

9. A method of inhibiting Δ^5-lipoxygenase which comprises administering to the circulatory system of a mammalian host an effective amount of a composition as defined in claim 1 or a pharmaceutically acceptable salt thereof.

4,889,875

PHENOLIC RESIN FOAMS OF HIGH FILLER CONTENT AND THEIR USE AS INSULATION

Aloys Aust, Niederkrüchten; Josef Tiroux, Troisdorf, and Franz Weissenfels, Siegburg, all of Fed. Rep. of Germany, assignors to Dynamit Nobel AG, Cologne and Isobloc GmbH, Niederkrüchten, both of, Fed. Rep. of Germany

Filed Dec. 23, 1987, Ser. No. 137,415

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1986, 3644468

Int. Cl.[4] C08J *9/14*

U.S. Cl. 521—123 **2 Claims**

1. Thermosetting resin hard foam with a filler content over 100 wt.-% with respect to the resin content of the foam, prepared by foaming a fluid mixture of the corresponding resol resin, blowing agents, hardeners and fillers, characterized in that

(a) a furan-free phenolic resol resin is used as the resol resin, which is hardened by toluenesulfonic acid to which sulfuric acid is also added,

(b) at least 90% of the fillers is aluminum hydroxide, of which up to 10% can be replaced by silica,

(c) the aluminum hydroxide has a content of the grain size range under 5 microns between 30 and 60%.

4,889,876

COMPOSITE SUBSTANCE AND A METHOD FOR THE PRODUCTION OF THE SAME

Tohru Yamamoto, c/o Nakato Laboratory Inc., 6, Ohshinohara, Yasu-cho, Yasu-gun, Shiga-ken, Japan

Filed Mar. 31, 1988, Ser. No. 175,554

Claims priority, application Japan, Apr. 2, 1987, 62-082279

Int. Cl.[4] C08F *2/46*

U.S. Cl. 522—135 **28 Claims**

1. A composite substance comprising a conjugated polymer having a major inorganic portion and a minor organic portion, wherein

said inorganic portion is an alkoxide compound selected from the group consisting of $Si(OC_2H_5)_4$, $B(OC_2H_5)_3$, $P(OC_2H_5)_3$, $P(OCH_3)_3$, $Al(O—iso—C_3H_7)_3$, $Ti(O—iso—C_3H_7)_4$, $Zr(O—t—C_4H_9)_4$, $Zr(O—n—C_4H_9)_4$, $Ca(OC_2H_5)_2$, $Fe(OC_2H_5)_3$, $V(O—iso—C_3H_7)_4$, $Sn(O—t—C_4H_9)_4$, $Li(OC_2H_5)$, and $Be(OC_2H_5)_3$, and

said organic portion comprises a silane coupling agent selected from the group consisting of (gamma-glycidoxypropyl)trimethoxysilane, (gamma-glycidoxypropyl)methyldiethoxysilane, beta-(3,4-epoxycyclohexyl)ethyltrimethoxysilane, vinyltrimethoxysilane, vinyltrichlorosilane, vinyltris(beta-methoxyethoxy)silane, vinyltriacetoxysilane, (gamma-methacryloxypropyl)trimethoxysilane, N-beta-(N-vinylbenzylaminoethyl)-gamma-aminopropyltrimethoxysilane hydrochloride, gamma-aminopropyltriethoxysilane, N-phenyl-gamma-aminopropyltrimethoxysilane, gamma-(2-aminoethyl)aminopropyltrimethoxysilane, gamma-(2-aminoethyl)aminopropylmethyldimethoxysilane, gamma-mercaptopropyltrimethoxysilane, gamma-mercaptopropylmethyldimethoxysilane, methyltrimethoxysilane, methyltriethoxysilane, hexamethyldisilazane, gamma-anilinopropyltrimethoxysilane, gamma-chloropropylmethyldimethoxysilane, methyltrichlorosilane, dimethyldichlorosilane, trimethylchlorosilane, and octadecyldimethyl-(3-(trimethoxysilyl)-propyl)ammonium chloride, and an organic monomer selected from the group consisting of acrylic acid, methacrylic acid, dimethylformamide, acrylonitrile, styrene, methyl acrylate, ethyl acrylate, methyl methacrylate, and ethyl methacrylate,

wherein said major inorganic portion and said minor organic portion are bound together on a molecular level.

4,889,877

HIGH SOLIDS CB PRINTING INK

Michael E. A. Seitz, Dayton, Ohio, assignor to The Standard Register Company, Dayton, Ohio

Filed Jan. 7, 1988, Ser. No. 141,632

Int. Cl.[4] C09D *5/00, 11/00*

U.S. Cl. 523—161 **12 Claims**

1. A high solids content, aqueous, microcapsule-containing printing ink, having a solids content of approximately 60–70% by weight, said printing ink comprising:

an aqueous solution containing water and a non-volatile diluent selected from the group consisting of methyl glucoside, dimethyl urea, dimethyl hydantoin formaldehyde resin, sorbitol, erythritol, and polyoxyethylene polyols,

oil-containing microcapsules dispersed in said aqueous solution.

4,889,878

FLOWABLE JOINT SEALANT FOR CONCRETE HIGHWAY

Peggy L. Dixon, and Christine M. Schmidt, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Apr. 15, 1988, Ser. No. 181,792

Int. Cl.[4] C08K *9/04, 5/09, 3/26;* C08L *83/08*

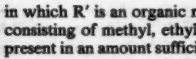
U.S. Cl. 523—200 **9 Claims**

1. A composition which is stable in the absence of moisture but curable at room temperature upon exposure to moisture to a silicone elastomer and being self leveling when applied to a horizontal surface, said composition consisting essentially of a mixture prepared by mixing under anhydrous conditions

(A) 100 parts by weight of a hydroxyl endblocked polydiorganosiloxane having a viscosity of 25° C. of from 45 to 65 Pa.s and in which the organic groups are selected from the group consisting of methyl, ethyl, vinyl, phenyl, and 3,3,3-trifluoropropyl radicals, in said polydiorganosiloxane no more than 50 percent of the organic groups being phenyl or 3,3,3-trifluoropropyl radicals and no more than 10 percent of the organic groups being vinyl radicals,

(B) from 55 to 120 parts by weight of non-acidic, non reinforcing filler having an average particle size of from 2 to 15 micrometers, said filler consisting of from 0 to 60 percent by weight of an untreated calcium carbonate filler and from 40 to 100 percent by weight of a calcium stearate treated calcium carbonate filler,

(C) from 2.5 to 10 parts by weight of a silane of the general formula



in which R' is an organic radical selected from the group consisting of methyl, ethyl, and phenyl, said silane being present in an amount sufficient to provide at least on silane molecule per hydroxyl of the polydiorganosiloxane,

(D) from 1 to 6 parts by weight of an aminoxysilicone compound having from 1 to 100 silicon atoms per molecule and from 3 to 10 aminoxy groups per molecule,

said aminoxy group having a general formula —OX in which X is a monovalent amine radical selected from the group consisting of —NR_2 and a heterocyclic amine, R is a monovalent hydrocarbon radical, the —OX group being bonded to silicon atoms through an SiO bond, the remaining valences of the silicon atoms in the aminoxysilicone compound being satisfied by divalent oxygen atoms which link the silicon atoms of the aminoxysilicone compounds having two or more silicon atoms per molecule through silicon-oxygen-silicon bonds and by monovalent hydrocarbon radicals and halogenated monovalent hydrocarbon radicals bonded to the silicon atoms through silicon-carbon bonds, there being an average of at least one monovalent hydrocarbon radical or halogenated monovalent hydrocarbon radical per silicon atom,

said silane (C) and said aminoxysilicone compound (D) being present in amount sufficient to provide a combined weight of at least 5 parts by weight per 100 parts by weight of (A), and said aminoxysilicone compound (D) being present in an amount which is not greater than the weight of the silane (C),

the composition being self leveling when applied to a horizontal surface and curing upon exposure to moisture to give an elastomer having an elongation of at least 1200 percent, a durometer on the Shore 00 scale of from 45 to 75 inclusive and a modulus at 150 percent elongation of less than 50 pounds per square inch.

4,889,879

THERMOPLASTIC COMPOSITIONS WITH VERY HIGH CONTENT OF PULVERIZED MINERAL MATERIALS FOR INCORPORATION IN POLYMERS

Henry Seinera, Oullins; Patricia Luberne, Gennevilliers; Claude Stock, Champs-sur-Marne, and Patrick Trouve, Clamart, all of France, assignors to Pluess Staufer AG, Oftringen, Switzerland

Filed Jul. 24, 1987, Ser. No. 77,286

Claims priority, application France, Jul. 30, 1986, 86 11239

The portion of the term of this patent subsequent to Feb. 7, 2006, has been disclaimed.

Int. Cl.[4] C08K *9/04, 3/00, 5/00, 5/09;* **C08L** *23/08, 23/28, 23/02, 51/06*

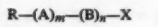
U.S. Cl. 524—13 **17 Claims**

1. A coherent thermoplastic aggregate composition comprising:

(a) 19.99 to 4.05 parts by weight, relative to the total mass, of at least one thermoplastic polyolefin polymer of copolymer of both, not containing polar monomers, having a melting or softening point at least equal to 60° C. and index of fluidity at least 50;

(b) 80 to 95 parts by weight, relative to the total mass of a pulverized mineral material, representing 400 to 1900 parts by weight per 100 parts be weight of said polymer or copolymer or both; and

(c) 0.01 to 0.95 parts by weight of a fluidizing agent, relative to the total mass of the mixture, wherein said fludizing agent corresponds to the formula:



containing at least one free acid function, where X is a carboxylic, sulfonic, sulfuric, phosphonic or phosphonic radical, (A) is ethylene oxide, (B) is propylene oxide, with (m+n) equal to or greater than 0 and equal to or less than 24, wherein R is a linear or nonlinear, saturated or unsaturated alkyl radical, aryl radical, alkyl-aryl radical, or heterocyclic compound, saturated or not, containing from 5 to 28 carbon atoms, or a steroid

---

4,889,880

MODIFIED ASPHALT COMPOSITIONS

H. Richard Miller, Solon, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Continuation-in-part of Ser. No. 879,866, Jul. 27, 1986, abandoned. This application Mar. 14, 1988, Ser. No. 167,596

Int. Cl.[4] C08L *23/18, 95/00*

U.S. Cl. 524—71 **4 Claims**

1. An asphalt concrete composition comprising at least about 85% by weight aggregate and

(A) asphalt, and

(B) from about 0.01 to about 5% by weight, based on the weight of the asphalt of at least one polymer which is a homoploymer of isobutylene or a copolymer of isobutylene, said polymer having a weight average molecular weight (Mw) of about 75,000 to about 130,000.

4,889,881

ETHYLENE-α-OLEFIN VULCANIZED RUBBER COMPOSITION

Hiroyoshi Takao, Chiba; Yoshio Tanimoto, Sakura, and Kiyosi Ikeda, Ichihara, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 34,943, Apr. 6, 1987, abandoned. This application Aug. 9, 1988, Ser. No. 230,661

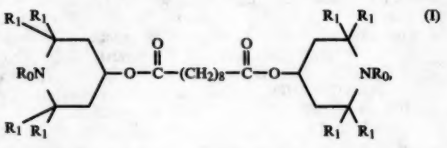
Claims priority, application Japan, Apr. 14, 1986, 61-85802

Int. Cl.[4] C08K *3/36, 5/14;* **C08L** *23/16*

U.S. Cl. 524—91 **12 Claims**

1. An ethylene-α-olefin vulcanized rubber composition with excellent weather resistance and high transparency which is formed by vulcanizing with an organic peroxide an unvulcanized rubber composition consisting essentially of an ethylene-α-olefin rubber containing no metal oxide nor metal carbonate added thereto and containing 10 to 70 parts by weight of anhydrous silica with an average particle diameter of its primary particles of 20 nm or less, 0.01 to 2 parts by weight of at least one compound selected from those represented by the general formula (I), (II) and (III) shown below, and 0 to 2 parts by weight of at least one compound selected from those represented by the general formulas (V) and (VI) shown below, each relative to 100 parts by weight of said rubber:

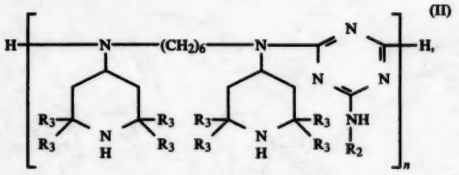
General formula (I)



(I)

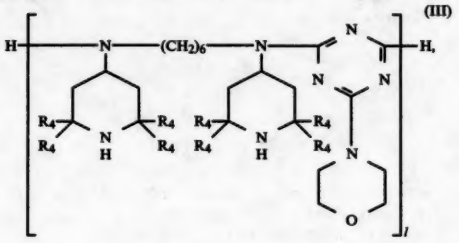
wherein R_0 denotes hydrogen or an alkyl group of 1 to 3 carbon atoms, and R_1 denotes an alkyl group of 1 to 3 carbon atoms;

General formula (II)



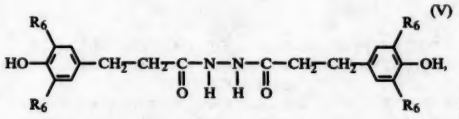
wherein R_2 denotes an alkyl group of 6 to 10 carbon atoms, R_3 denotes an alkyl group of 1 to 3 carbon atoms, and n denotes a real number from 1 to 5;

General formula (III)



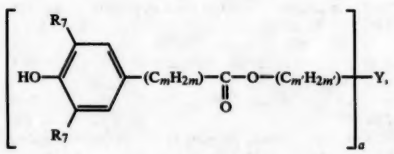
wherein R_4 denotes an alkyl group of 1 to 3 carbon atoms, and l denotes a real number from 1 to 5;

General formula (V)



wherein each R_6 denotes an alkyl group of 1 to 9 carbon atoms; and

General formula (VI)



wherein each R_7 denotes an alkyl group of 1 to 6 carbon atoms, Y denotes C, S, C—C or O—C—C—O, a denotes a number of 1, 2 or 4, m denotes an integer from 1 to 6, and m′ denotes an integer from 1 to 16.

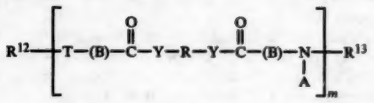
4,889,882

TETRAMETHYL PIPERIDYL TERMINATED TRIAZINE OLIGOMERIC ESTERS AND AMIDES

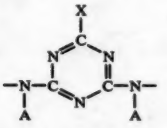
Richard V. Nelson, Wilmington, Del., and John F. Stephen, West Chester, Pa., assignors to ICI Americas Inc., Wilmington, Del.

Filed Dec. 15, 1988, Ser. No. 284,583
Int. Cl.[4] C08K 5/34
U.S. Cl. 524—100 **17 Claims**

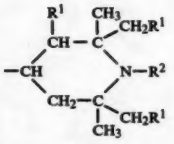
1. A compound of the Formula I



wherein T is the divalent group:



wherein A is:



R^1 is selected from hydrogen and an alkyl group 1–5 carbon atoms,

R^2 is selected from hydrogen, oxyl, hydroxyl, a straight or branched alkyl group 1–18 carbon atoms, an alkanoyl group having 2–18 carbon atoms, an alkenyl group of 3–4 carbon atoms, an alkenoyl group of 3–6 carbon atoms, an alkynyl group of 3–6 carbon atoms, a cyanomethyl group, benzyl group of 7–15 carbon atoms and a group $—CH_2C-H(OR^3)—R^4$,

R^3 is selected from hydrogen, an aliphatic group of 1–18 carbon atoms, an araliphatic group and an alkanoyl group having 2–18 carbon atoms;

R^4 is selected from hydrogen, an alkyl group of 1–16 carbon atoms and phenyl;

X is a group selected from hydrogen, halogen, hydroxyl, alkyl group having 1–18 carbon atoms, cycloalkyl group having 5–12 carbon atoms, aryl group having 6–18 carbon atoms, aralkyl group having 7–18 carbon atoms, $—N(R^5)(R^6)$,—OR7, $—SR^7$, or

R^5 and R^6, same or different, can be selected from hydrogen, an alkyl group of 1–18 carbon atoms, a cycloalkyl group of 5–12 carbon atoms, an aralkyl group of 7–11 carbon atoms, an alkyl group having 3–12 carbon atoms that may have in the chain an —O— or $—N(R^9)—$ linkage, a hydroxyalkyl group having 2–4 carbon atoms, an acyloxyalkyl group having 3–15 carbon atoms, the group A, or R^5 and R^6, together with the N-atom to which they are attached form a heterocyclic ring selected from the group consisting of pyrrolidino, piperidino, and those containing an —O— linkage to form a morpholino group;

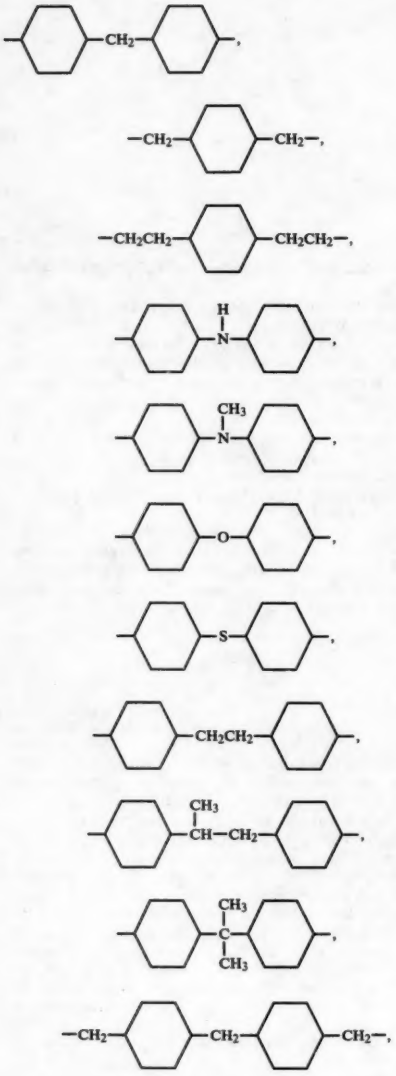
R^7 is selected from an alkyl group of 1–18 carbon atoms, an alkenyl group of 3–12 carbon atoms, a cycloalkyl group of 5–12 carbon atoms, an aralkyl group of 7–11carbon atoms, an alkyl group of 3–12 carbon atoms which possesses an —O— or $—N(R^9)$ in the chain, and aryl group of 6–14 carbon atoms;

R^8 and R^9 are selected from an alkyl group having 1–4 carbon atoms;

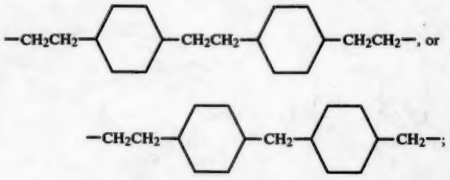
B is an alkylene group having 1–10 carbon atoms;

Y is selected from —O—, —N(H)—, and —N(R^{10})— where R^{10} represents an alkyl group of 1–20 carbon atoms or the group A,

R is selected from an alkylene group of 2–20 carbon atoms which may be straight-chained or branched wherein the alkylene may be interrupted by —O— —S—, or —N(R^{11})— wherein R^{11} is selected from hydrogen, an alkyl having 1–20 carbon atoms, the group A, a cycloalkylene group 5–12 carbon atoms, a divalent group selected from



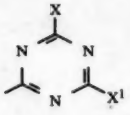
-continued



a group selected from an arylene group of 6–12 carbon atoms, or an aralkylene group of 8–14 carbon atoms,

R^{11} is an alkyl group of 1–18 carbon atoms, a cycloalkylene group of 5–12 carbon atoms or the group A,

R^{12} is the group X^1 and R^{13} is selected from hydrogen and the triazine group



where X is a previously defined and X^1 may be the same or different than X,

and m is an integer from 1 to 40.

4,889,883

USE OF PHENOL-MERCAPTOCARBOXYLIC ACID ESTERS AS STABILIZERS FOR SYNTHETIC ELASTOMERS

Siegfried Rosenberg, Riehen, and Kurt Schwarzenbach, Pfeffingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

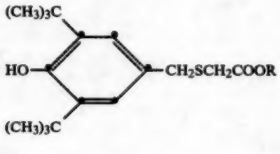
Continuation of Ser. No. 919,605, Oct. 14, 1986, abandoned, which is a continuation of Ser. No. 547,165, Oct. 3, 1983, abandoned, which is a continuation of Ser. No. 503,482, Jun. 13, 1983, abandoned, which is a continuation of Ser. No. 430,643, Sep. 30, 1982, abandoned, which is a continuation-in-part of Ser. No. 347,399, Feb. 10, 1982, abandoned. This application May 4, 1987, Ser. No. 47,527

Claims priority, application Switzerland, Feb. 19, 1981, 1107/81

Int. Cl.[4] C08K *5/36*

U.S. Cl. 524—289 **3 Claims**

1. Stabilised composition characterized by incorporating into synthetic elastomers selected from the group consisting of polybutadiene, polyisoprene, polychloroprene, styrene/-butadiene/styrene block polymers, styrene/isoprene/styrene block polymers, styrene/(ethylene-propylene)/ styrene block polymers and acrylonitrile/butadiene polymers 0.01 to 10%, based on the total weight of the material to be stabilised, of a phenol-mercapto-carboxylic acid ester of the formula IV



(IV)

wherein R is C_8-C_{13} alkyl.

4,889,884

SYNTHETIC BASED COLD SEAL ADHESIVES

Richard A. Dust, Maidenhead, and Peter Causton, High Wycombe, both of England, assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Apr. 18, 1988, Ser. No. 183,025
Int. Cl.[4] C08K 5/11; C08L 23/04
U.S. Cl. 524—314 6 Claims

1. A cold-seal adhesive composition comprising about 45 to 70% (by wt.) of a synthetic base polymer and about 30 to about 55% (by wt.) of a synthetic secondary polymer, wherein the base polymer comprises a synthetic polymer, a synthetic copolymer, or any mixture thereof characterized in that is possesses a Tg of about −40 to about −60° C. and a Williams plasticity number of about 2.5 to about 2.9; and the secondary polymer comprises a styrene-acrylic copolymer, a synthetic styrene-acrylic resin or any mixture thereof, or an admixture of one or more styrene-acrylic copolymers or styrene-acrylic resins, or any mixture thereof with one or more synthetic polymers, copolymers, or synthetic resins, characterized in that it possesses a Tg of about −25 to about +5° C. and a plasticity number of about 5.0 to about 5.6.

4,889,885

COMPOSITE MATERIAL CONTAINING A LAYERED SILICATE

Arimitsu Usuki; Tadashi Mizutani; Yoshiaki Fukushima; Megumi Fujimoto; Kenzo Fukumori; Yoshitsugu Kojima; Norio Sato; Toshio Kurauchi, and Osami Kamigaito, all of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Filed Mar. 4, 1988, Ser. No. 164,217
Claims priority, application Japan, Mar. 4, 1987, 62-49630; Mar. 9, 1987, 62-53706; Oct. 15, 1987, 62-260269; Dec. 22, 1987, 62-325049
Int. Cl.[4] C04B 26/02; C08K 3/04; C08L 9/00, 67/00
U.S. Cl. 524—445 17 Claims

1. A composite material, which comprises:

(a) at least one resin selected from the group consisting of a vinyl-based polymeric compound, a thermosetting resin and a rubber, and

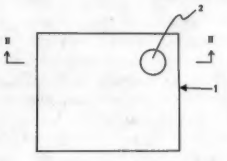
(b) a layered silicate uniformly dispersed in said resin, said layered silicate having a layer thickness of about 7 to 12 Å and an interlayer distance of at least about 30 Å, wherein said at least one resin is connected to said layered silicate through an intermediate therebetween.

4,889,886

LIQUID CRYSTAL POLYESTER COMPOSITION

Mitsuo Wada; Toshio Kanoe, both of Fuji, and Takayuki Ishikawa, Shimizu, all of Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

Filed Dec. 2, 1987, Ser. No. 127,404
Claims priority, application Japan, Dec. 10, 1986, 61-294426
Int. Cl.[4] C08K 7/14, 7/06, 3/34
U.S. Cl. 524—449 21 Claims



1. A liquid crystal polyester composition which comprises 99.5 to 30 percent by weight of a polyester of a type which is melt processable and which displays anisotropy in the molten state and 0.5 to 70 percent by weight of the total weight of the composition of a plate-like inorganic filler, which has an aspect ratio of at least 5 and a longest diameter of 0.1 micron to 3 mm.

4,889,887

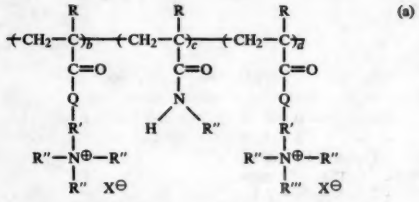
GELABLE ACID VISCOSIFIERS

You-Ling Fan; James P. Stanley, Bound Brook, and George L. Brode, Bridgewater, all of N.J., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Continuation of Ser. No. 864,273, May 19, 1986, abandoned.
This application Feb. 22, 1988, Ser. No. 159,826
Int. Cl.[4] C08K 3/16, 5/09; C08L 39/00
U.S. Cl. 524—510 8 Claims

1. A gelable acidic composition, suitable for acidizing a subterranean formation susceptible of attack by an acid, comprising: (a) an aqueous acid solution; (b) a water soluble acrylamide type polymer selected from the group consisting of polymers containing monomeric repeating units represented by the following formulas:

GENERIC FORMULA A



where

R=H or CH_3

R'=a linear or branched alkylene radical having from 2 to 10 carbon atoms;

R''=H or alkyl, linear or branched, having from 1 to 3 carbon atoms;

R'''=an alkyl group, linear or branched, having about 4 to about 25 carbon atoms, or aryl, alkaryl or aralkyl having from 6 to 18 carbon atoms;

Q=—NR— or —O—;

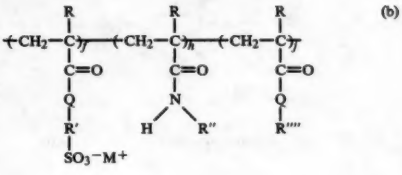
$X^{\ominus}$=a halogen ion or a lower alkyl sulfate ion;

b=from about 10 to 90 mole percent;

c=from about 10 to 90 mole percent; and

d=from 0 to about 10 mole percent;

GENERIC FORMULA B



where

R=H or CH_3;

R'=a linear or branched alkylene or arylene radical having from 2 to 10 carbon atoms

R''=H or alkyl, linear or branched, having from 1 to 3 carbon atoms;

M^+=H^+, Na^+, NH_4^+, or other monovalent metal cation;

Q=a divalent radical such as —O—, —NR—;

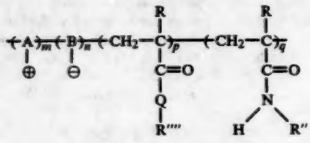
R''''=C_4–C_{18} alkyl, C_7–C_{24} aralkyl or an ethoxylated C_7–C_{24} aralkyl;

f=from about 10 to 60 mole percent;

h=from about 40 to 90 mole percent; and

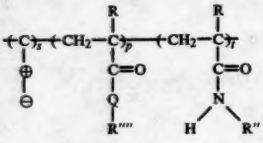
j=from 0 to 10 mole percent;

GENERIC FORMULA C



(c)

GENERIC FORMULA D



(d)

where

A⊕=the residue of a cationic monomer;

B⊖=the residue of an anionic monomer;

C⊕⊖=the residue of a Zwitter-ion monomer;

R, R", R"" and Q are the same as previously defined for Generic Formula B;

m=0–45 mole percent;

n=0–45 mole percent;

p=0–10 mole percent;

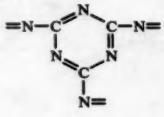
q=10–100 mole percent;

s=0–90 mole percent; and

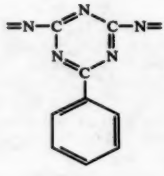
t=10–100 mole percent

with the provisos that the sums of the mole percents equals 100 mole percent and water soluble monomeric repeating units are provided in an amount sufficient to provide good solubility in the aqueous acidic composition; and (c) from about 0.05 to about 50 weight percent based on component (b) of a polyfunctional reactant capable of crosslinking said water soluble polymer in said acidic composition selected from he group consisting of monomers, oligomers and polymers containing a plurality of —CH_2OR or —CH_2CH_2OR alkylol groups attached to:

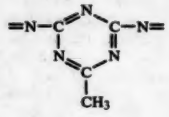
(A) a melamine nucleus of the structure:



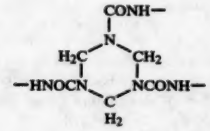
(B) a benzoguanamine nucleus of the structure:



(C) an acetoguanamine nucleus of the structure:



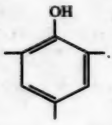
(D) a urea nucleus of the structure:



(E) a linear acrylamido polymer or copolymer containing a plurality of units of the formula:

or;

(F) a phenolic nucleus of the structure



4,889,888

ELASTOPLASTIC COMPOSITIONS AND PROCESS FOR PREPARING THEM

Mauro Bassi; Enea Garagnani, and Giuseppe Gorini, all of Ferrara, Italy, assignors to Himont Incorporated, Wilmington, Del.

Filed Dec. 9, 1988, Ser. No. 282,701

Claims priority, application Italy, Dec. 11, 1987, 22946 A/87

Int. Cl.[4] C08L *23/26, 25/04, 51/06, 53/02*

U.S. Cl. 525—75 **8 Claims**

1. An elastomeric composition comprising a continuous crystalline polyolefin phase and at least two polymeric phases of discrete particles dispersed in the polyolefin phase, one of which consists of a dynamically fully cured EPDM rubber and the other of an amorphous thermoplastic styrene polymer selected from the group consisting of polyestyrene, high impact polystyrene, copolymers of styrene with acrylonitrile containing up to 30% by weight of acrylonitrile, styrene-ethylene-butene-styrene block copolymer and partially hydrogenated styrene-butadiene block copolymers, wherein the EPDM rubber is copolymer of ethylene with propylene or with an alpha-olefin of the formula CH_2=CHR in which R is an alkyl radical having 2–10 carbon atoms, and with a copolymerizable diene, the weight ratio between polyolefin resin and EPDM rubber ranges from about 10/90 to about 75/25 and the weight ratio between styrene polymer and polyolefin ranges from 10/90 to about 60/40 and at least 80% of the particles of the dispersed phases have a maximum size below 5μ.

4,889,889

TRIALKYLAMINE SALT-FUNCTIONALIZED POLYPHENYLENE ETHERS METHODS FOR THEIR PREPARATION, AND COMPOSITIONS CONTAINING THEM

John B. Yates, III, Glenmont, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 878,722, Jun. 26, 1986, Pat. No. 4,755,566. This application Feb. 22, 1988, Ser. No. 158,517

Int. Cl.[4] C08G 65/48; C08L 53/04, 71/04, 77/00

U.S. Cl. 525—92 14 Claims

1. A method for preparing a resin composition which comprises mixing in the melt at least one polyphenylene ether, at least one polyamide, at least one impact modifying resin for polyphenylene ether-polyamide compositions and at least one functionalizing compound comprising a trialkylamine or tri-(aryl-substituted alkyl)amine salt of maleic or fumaric acid.

4,889,890

POWDER COATING CURING SYSTEM CONTAINING A BETA-HYDROXYALKYLAMIDE

Paul R. Kerr; Paul H. Pettit, Jr., both of Allison Park, and William S. Ewing, Tarentum, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 30, 1987, Ser. No. 139,489

Int. Cl.[4] C08L 33/08, 67/02

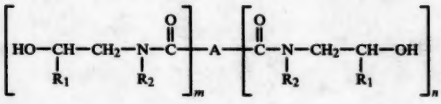
U.S. Cl. 525—113 5 Claims

1. A thermosetting powder coating composition comprising a co-reactable particulate mixture of:

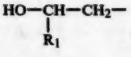
(a) about 35 to about 85 percent by weight based on weight of resin solids of a carboxylic acid group-containing polymer having a Tg in the range of about 35° C. to 100° C.;

(b) from about 2 to about 45 percent by weight based on weight of resin solids of a polyepoxide having a 1,2-epoxy equivalency of greater than 1.0; and

(c) a beta-hydroxyalkylamide of the structure:



where R_1 is H or C_1–C_5 alkyl; R_2 is H, C_1–C_5 alkyl or



wherein R_1 is as described above and A is a chemical bond or monovalent or polyvalent organic radical derived from saturated, unsaturated or aromatic hydrocarbon radicals including substituted hydrocarbon radicals containing from 2 to 20 carbon atoms, m equals 1 to 2, n equals 0 to 2 and m+n is at least 2, and the equivalent ratio of beta-hydroxyalkylamide equivalents plus epoxy equivalents to carboxylic acid equivalents being within the range of 0.6 to 1.6:1.

4,889,891

NOVEL RUBBER COMPOUNDING RESORCINOLIC RESINS

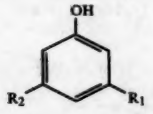
Bojayan Durairaj; Alex Peterson, Jr., and Gideon Salee, all of Pittsburgh, Pa., assignors to Indspec Chemical Corporation, Pittsburgh, Pa.

Filed Aug. 30, 1988, Ser. No. 238,322

Int. Cl.[4] C08L 61/00

U.S. Cl. 525—139 4 Claims

1. A vulcanizable rubber composition comprising (I) a rubber component selected from at least one member of the group consisting of natural rubber, styrene butadiene copolymer rubber, polyisoprene rubber, polybutadiene rubber, acrylonitrile butadiene rubber and polychloroprene rubber, (II) a methylene donor compound which is capable of generating formaldehyde by heating and (III) a methylene acceptor prepared by reacting (A) an alkyl substituted resorcinol or phenol prepared by reacting at least one of the compound of the formula



wherein R_1 and R_2 may be the same or different radicals selected from the group consisting of —H, —OH, $—NH_2$ and an alkyl of 1 to about 20 carbon atoms with a mono or polyunsaturated hydrocarbon selected from the group consisting of butene, diisobutylene, piperylene, dipentene, dicyclopentadiene, cyclopentadiene, isoprene, butadiene, pinene, styrene and divinylbenzene in the presence of an acid catalyst, with (B) an aldehyde selected from the group consisting of formaldehyde, paraformaldehyde, acetaldehyde, propionaldehyde, butyraldehyde, crotonaldehyde, benzaldehyde and furfural.

4,889,892

FLEXIBLE COMPOSITIONS BASED ON VINYL CHLORIDE POLYMERS COMPRISING POLY-ε-CAPROLACTONE

Pierre Malfroid, Grez-Doiceau; Qui Long Nguyen, Liege; Jean-Marie Blondin, and Jean-Paul Burnay, both of Brussels, all of Belgium, assignors to Solvay & Cie, Belgium

Filed Jul. 19, 1988, Ser. No. 221,329

Claims priority, application France, Jul. 24, 1987, 87 10613

Int. Cl.[4] C08L 27/06, 31/00

U.S. Cl. 525—186 8 Claims

1. Flexible compositions based on vinyl chloride polymers and on poly-ε-caprolactone, consisting essentially of vinyl chloride polymers chosen from the copolymers of vinyl chloride and of alkyl acrylates in which the alkyl radicals consist of linear or branched chains containing from 1 to 10 carbon atoms and of poly-ε-caprolactone wherein the initial Shore A hardness of the compositions does not exceed 85.

4,889,893

POLYPHENYLENE SULFIDE RESIN COMPOSITION AND A PROCESS FOR PRODUCING IT

Hirokazu Kobayashi, and Akihiko Kishimoto, both of Nagoya, Japan, assignors to Toray Industries, Tokyo, Japan

Continuation-in-part of Ser. No. 942,509, Dec. 16, 1986, abandoned. This application Jan. 7, 1988, Ser. No. 142,669

Claims priority, application Japan, Dec. 27, 1985, 60-292801; Dec. 27, 1985, 60-292802

Int. Cl.[4] C08L 81/04

U.S. Cl. 525—189 9 Claims

1. A polyphenylene sulfide resin composition comprising:

(A) 99.5 to 50% by weight of a polyphenylene sulfide resin and

(B) 0.5 to 50% by weight of an olefinic copolymer containing 60 to 99.5% by weight of an α-olefin and 0.5 to 40% by weight of a glycidyl ester of an α,β-unsaturated carboxylic acid, characterized in that said polyphenylene sulfide resin (A) is immersed under stirring in at least one member selected from the group consisting of an acid, an acid solution and hot water which is at a temperature of 100° C. or higher for a time sufficient to improved its affinity with said olefinic copolymer (B).

4,889,894

COMPATIBLE POLYMER MIXTURES

Werner Siol, Darmstadt-Eberstadt, and Ulrich Terbrack, Reinheim, both of Fed. Rep. of Germany, assignors to Rohm GmbH, Darmstadt, Fed. Rep. of Germany

Filed Nov. 10, 1987, Ser. No. 119,089

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1986, 3638443; Sep. 17, 1987, 3731248

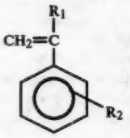
Int. Cl.[4] C08L *33/06, 25/04;* **C08F** *277/00*

U.S. Cl. 525—227 **23 Claims**

1. A compatible polymer mixture of two different polymer components, comprising:

a miscible polymer mixture of

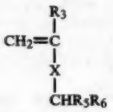
(A) 0.1–99.9% by weight of a polymer P1, which comprises at least 30% by weight of monomers with Formula I,



I

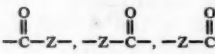
wherein R_1 is hydrogen or methyl and R_2 is a hydrocarbon group with 1–18 carbon atoms, and wherein said polymer P1 contains less than 20 wt. % styrene or α-methyl styrene, and

(B) 99–0.1% by weight of a polymer P2 which comprises at least 30% by weight of a monomer with Formula II



II

wherein R_3 is hydrogen, methyl or a group $—CH_2—X—CHR_5R_6$, X is



wherein Z is oxygen or $—NR_4$, Z′ is oxygen or $—NR_4$, and R_4 is hydrogen or an alkyl group with 1–12 carbon atoms, $—CHR_5R_6$ is an aliphatic or araliphatic hydrocarbon group with 5–24 carbon atoms.

4,889,895

ELECTRON BEAM CURABLE COPOLYMER USEFUL IN RECORDING MEDIA

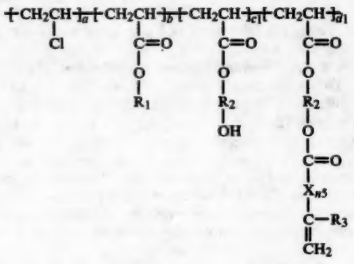
John G. Chernega, Stillwater; John A. Martens, North Oaks; Roger A. Olsen, Woodbury, and Auburn B. Cottingham, deceased, late of Elmo, all of Minn. (by Sue E. Cottingham, administrator), assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 868,134, May 28, 1986, Pat. No. 4,783,370. This application Aug. 8, 1988, Ser. No. 229,278

Int. Cl.[4] C07C *125/04*

U.S. Cl. 525—278 **9 Claims**

1. An electron beam curable copolymer of at least one hydroxy functional alkyl acrylate and at least one polyvinyl chloride having the formula



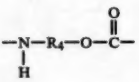
wherein

the portion of the copolymer having the a subscript comprises 50 to 97 weight percent of the copolymer, the portion of the copolymer having the b subscript comprises 0 to 30 weight percent of the copolymer, the portion of the copolymer having the c1 subscript comprises 0.1 to 7 weight percent of the copolymer, the weight ratio of the portion of the copolymer having the d1 subscript to the portion having the c1 subscript is from 0.2 to 4.0,

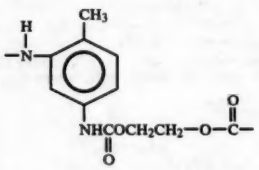
R_1 is an alkyl group selected from $—CH_3$ and $—(CH_2)_{n1}CH_3$ wherein n1=1–10,

R_2 is an alkylene group selected from $—(CH_2)_{n1}$ and $—CH_2)_{n2}(CH)(CH_2)_{n3}CH_3$ wherein n2=1–4 and n3=0–4,

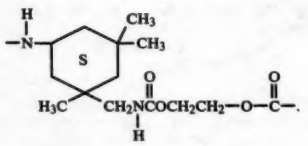
R_3 is selected from the group consisting of —H, $—CH_3$ and $—CH_2)_{n4}CH_3$, wherein n4=0–4, n5=0 or 1, and X is a linking group which is stable under electron beam irradiation and is selected from the group consisting of



wherein R_4 is selected from the group consisting of alkylene moieties having 1–6 carbon atoms and cycloalkylene moieties having 5–8 carbon atoms;



and



4,889,896

PROCESS FOR THE IMIDIZATION OF COPOLYMERS OF MALEIC ANHYDRIDE WITH VINYL-AROMATIC MONOMERS

Luciano Canova, Novara; Umberto Giannini, Milan; Enrico Albizzati, Novara; Italo Borghi, Ferrara, and Antonio Proto, Novara, all of Italy, assignors to Montedipe S.p.A., Milan, Italy

Filed Dec. 27, 1988, Ser. No. 289,824
Claims priority, application Italy, Dec. 29, 1987, 23242 A/87
Int. Cl.[4] C08F 8/70
U.S. Cl. 525—375 31 Claims

1. Process for imidizing copolymers of maleic anhydride with vinyl-aromatic monomers, using an urea as the imidizing agent.

4,889,897

OXIDATION OF POLYETHYLENE

Ludwig Schuster, Limburgerhof; Albert Hettche, Hessheim; Werner Liedy, Hochdorf-Assenheim; Stefan Weiss, Neckargemuend, and Leo Ehemann, Roedersheim-Gronau, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jun. 15, 1988, Ser. No. 206,663
Claims priority, application Fed. Rep. of Germany, Jun. 25, 1987, 3720952
Int. Cl.[4] C08F 8/06
U.S. Cl. 525—388 2 Claims

1. A process for preparing an oxidized polyethylene having an acid number of from 10 to 40 mg of KOH/g which comprises:

passing an oxidation gas into the free space of a horizontally disposed paddle dryer partially filled with finely divide,d high density polyethylene at a temperature below the softening point of the polyethylene and above 100° C., said paddle dryer including a rotatable longitudinal shaft along its axis to which outwardly directed paddles are attached, the oxidation gas containing sufficient ozone to provide not less than 100 mg of ozone per kilogram of polyethylene; and

rotating the shaft and paddles to circulate the polyethylene particles below the free space of the paddle dryer occupied by the oxidation gas.

4,889,898

THERMOPLASTIC POLYESTER BLENDS OF IMPROVED IMPACT RESISTANCE

Yeon F. Liang, Kohler, Wis., assignor to Plastics Engineering Company, Sheboygan, Wis.

Filed Feb. 8, 1989, Ser. No. 308,170
Int. Cl.[4] C08L 69/00
U.S. Cl. 525—67 2 Claims

1. A polymer blend of improved impact resistance comprising:

(a) about 5 to about 95 parts by weight of a polyalkylene terephthalate resin;

(b) about 5 to about 95 parts by weight of a polycarbonate;

(c) about 1 to about 20 parts by weight of an acid-modified polyolefin prepared by reacting a low density polyethylene having a molecular weight of about 7000 and a density of about 0.907 with maleic anhydride.

4,889,899

METHOD OF PRODUCING SILICON CARBIDE PRECERAMIC VINYL-CONTAINING POLYMERS

Duane R. Bujalski, Bay City; Gary E. Le Grow; Jonathan Lipowitz, both of Midland, all of Mich., and Thomas F. Lim, Solon, Ohio, assignors to Dow Corning Corporation, Midland, Mich.

Filed Sep. 8, 1987, Ser. No. 94,347
Int. Cl.[4] C08F 283/00; C08G 77/04
U.S. Cl. 525—479 50 Claims

1. A method of preparing a first polysilane, containing at least one weight percent vinyl, having the general formula

$$[RSi][R_2Si]$$

where there are present 0 to 60 mole percent $[R_2Si]$ units and 40 to 100 mole percent [RSi] units or having the general formula

$$[RSi][R_2Si][R''Si]$$

where there are present 0 to 40 mole percent $[R_2Si]$ units, 0.1 to 99.9 mole percent [RSi] units, and 0.1 to 99.9 mole percent [R"Si] units where R is an alkyl radical containing 1 to 8 carbon atoms, R" is selected from the group consisting of alkyl radicals of at least six carbon atoms, phenyl radicals, and radicals of the formula $A_yX_{(3-y)}Si(CH_2)_z$— where A is a hydrogen atom or an alkyl radical containing 1 to 4 carbon atoms, y is an integer equal to 0 to 3, X is chlorine or bromine, and z is an integer greater than or equal to 1, and where the remaining bonds on silicon are attached to other silicon atoms and vinyl groups, said method consisting of reacting under anhydrous conditions in the presence of a solvent a second polysilane of general formula

$$[RSi][R_2Si]$$

where there are present 0 to 60 mole percent $[R_2Si]$ units and 40 to 100 mole percent [RSi] units or of the general formula

$$[RSi][R_2Si][R''Si]$$

where there are present 0 to 40 mole percent $[R_2Si]$ units, 0.1 to 99.9 mole percent [RSi] units, and 0.1 to 99.9 mole percent [R"Si] units where R is an alkyl radical containing 1 to 8 carbon atoms, R" is selected from the group consisting of alkyl radicals of at least six carbon atoms, phenyl radicals, and radicals of the formula $A_yX_{(3-y)}Si(CH_2)_z$— where A is a hydrogen atom or an alkyl radical containing 1 to 4 carbon atoms, y is an integer equal to 0 to 3, X is chlorine or bromine, and z is an integer greater than or equal to 1, and where the remaining bonds on silicon are attached to other silicon atoms and chlorine or bromine atoms with vinyl Grignard reagent or vinyllithium, at a temperature of 0° to 120° C. and thereafter removing the solvent at a temperature of less than about 200° C. to obtain the vinyl-containing first polysilane.

4,889,900

PREPARATION OF ALKYL METHACRYLATE MONOMERS FOR ANIONIC POLYMERIZATION

Donn A. DuBois, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jun. 12, 1989, Ser. No. 364,955
Int. Cl.[4] C08F 4/46, 18/12, 18/02
U.S. Cl. 526—77 15 Claims

1. A process for preparing polymer of a methacrylate monomer comprising:

(a) providing a starting material comprising a methacrylate monomer capable of anionic polymerization and an alcohol;

(b) contacting said starting material with about 0.1 to about 1.4 mole percent, based on moles of the methacrylate monomer, of an alcohol-scavenging agent selected from the group consisting of aluminum hydrocarbyl, boron hydrocarbyl, aluminum hydride, boron hydride, and mix-

tures thereof, under conditions effective for reaction of the alcohol-scavenging agent and at least a portion of the alcohol to produce a mixture comprising the methacrylate monomer and reaction by-products; and

(c) contacting said mixture with an anionic polymerization initiator unit anionic polymerization conditions to produce the said polymer having a molecular weight distribution between about 1.20 and about 1.01.

4,889,901

ULTRAVIOLET-CURABLE BLENDS OF ACRYLATED POLYURETHANES AND SILSESQUIOXANE OLIGOMERS HAVING IMPROVED ADHESION TO GLASS

Sami A. Shama, and John L. Derer, both of Des Plaines, Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Nov. 16, 1988, Ser. No. 271,659
Int. Cl.[4] C08F *30/08*
U.S. Cl. 526—279 **12 Claims**

1. A light-curable ethylenically unsaturated liquid coating composition which cures to provide low modulus coatings adapted for the primary or single coat coating of optical glass fiber and having improved adhesion comprising:

(1) an acrylate-terminated polyurethane oligomer;

(2) a monoethylenically unsaturated liquid having a glass transition temprature, measured on a homopolymer thereof, below about 0° C. and which reduces the modulus of the coating; and

(3) a silsesquioxane oligomer polyacrylate which is the condensation reaction product of about two moles of hydroxyalkyl acrylate in which the alkyl group contains from 2 to 4 carbon atoms, with about one mole of a silsesquioxane polysilanol, the proportion of said silsesquioxane oligomer polyacrylate being in the range of from about 2% to about 60% of the weight of said coating composition.

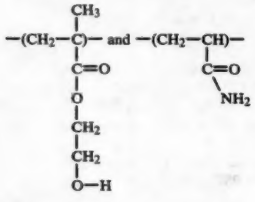
4,889,902

SOLUBLE OR CROSSLINKED GRAFT COPOLYMERS OF LIGNIN ACRYLAMIDE AND 2-HYDROXYETHYLMETHACRYLATE

John J. Meister, 31675 Westlady Rd., Beverly Hills, Mich. 48010-5624

Filed Dec. 20, 1988, Ser. No. 287,000
Int. Cl.[4] C08H *5/02*
U.S. Cl. 527—400 **5 Claims**

1. A graft copolymer of lignin, having a central lignin network and at least one grafted side chain having randomly repeating units of the formulas:



wherein the ratio of such repeating units ranges from about 0.25 molar percent to about 99.75 molar percent, and from about 0.25 molar percent to about 99.75 molar percent, respectively, such that the central lignin network has a molecular weight of about 1,000 to 150,000 and the total number of randomly repeating units in the grafted side chain or chains is in the range of 1 to 300,000 units, and such that the total graft copolymer molecular weight is in the range of 1,000 to 30,000,000.

4,889,903

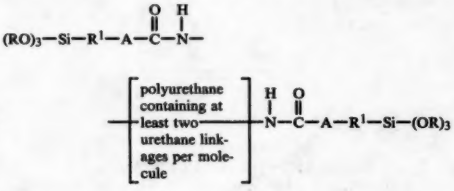
FAST-CURE POLYURETHANE SEALANT COMPOSITION CONTAINING TITANIUM ESTER ACCELERATORS

Jamil Baghdachi, Northville, Mich., assignor to BASF Corporation, Clifton, N.J.

Filed Aug. 3, 1988, Ser. No. 227,938
Int. Cl.[4] C08G *77/06*
U.S. Cl. 528—17 **12 Claims**

1. A one-component, moisture-curable sealant composition comprising a mixture of

(a) a silane-terminated polyurethane polymer of the formula



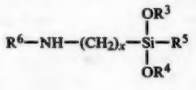
wherein

R is lower alkyl of from 1 to 6 carbon atoms;

R^1 is a divalent bridging radical selected from the group consisting of a divalent hydrocarbon radical, a divalent hydrocarbon ether radical, and a divalent hydrocarbon amino radical;

A is selected from the group consisting of —S— and —NR^2— where R^2 is hydrogen or alkyl of from one to six carbon atoms;

(b) from 0.2 to 1.0 parts by weight of an aminosilane per 100 parts by weight of said polyurethane polymer, said aminosilane having the structure



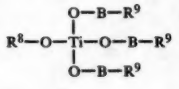
wherein

x is an integer of from one to three; R^3 and R^4 are the same or different and are selected from alkyl of from one to four carbon atoms;

R^5 is alkyl of from one to four carbon atoms or alkoxyl of from one to four carbon atoms;

R^6 is hydrogen or $—(CH_2)_yNHR^7$ wherein R^7 is hydrogen or $—(CH_2)_zNH_2$ wherein y and z may be the same or different and are integers of from one to three;

(c) from 0.2 to 1.0 parts by weight of an accelerator per 100 parts by weight of said polyurethane polymer, wherein said accelerator has the structure



wherein

B is a direct bond or is $—SO_2—$;

R^8 is a hydrocarbyl group of from three to twenty carbon atoms, and

R^9 is $—(R^{10}—NH)_m—R^{10}—NH_2$ wherein m is zero or an integer of from one to four;

R^{10} is selected from

a divalent hydrocarbyl radical of from two to ten carbon atoms, derived by removal of two hydrogen atoms from

a branched or unbranched saturated or unsaturated acyclic hydrocarbon;
a divalent hydrocarbaryl radical of from six to ten carbon atoms, and
a divalent cyclohydrocarbyl radical of from three to ten carbon atoms.

4,889,904
PROCESS FOR THE PREPARATION OF METHYLPOLYSILANES HAVING CONTROLLED CARBON CONTENT
Gary T. Burns, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.
Filed Jul. 22, 1988, Ser. No. 223,007
Int. Cl.[4] C08G 77/06
U.S. Cl. 528—25 18 Claims

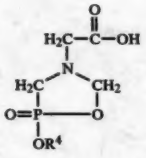
1. A process for the preparation of a methylpolysilane having a controlled carbon content comprising the steps of:
(a) heating together to form a reaction mixture at least one alkoxy-functional disilane selected from the group consisting of disilanes having two, three, and four alkoxy groups bonded to the silicon atoms, and mixtures thereof, with an alkoxy-functional silane having at least one unsaturated substituent in an amount effective to increase the carbon content of the resulting polymer, said alkoxy-functional silane having a boiling point of at least about 110° C., in the presence of a catalyst which is a source of alkoxide ions;
(b) reacting said mixture for a time sufficient for an alkoxy-functional methylpolysilane to form while separating by-produced volatile alkoxysilane materials from said reaction mixture; and
(c) separating said catalyst from said alkoxy-functional methylpolysilane which has formed.

4,889,905
CURABLE ORGANOPOLYSILOXANE COMPOSITION
Toshio Suzuki, Tokyo, Japan, assignor to Toray Silicone Company Limited, Tokyo, Japan
Filed Nov. 14, 1986, Ser. No. 930,633
Claims priority, application Japan, Dec. 17, 1985, 60-283637
Int. Cl.[4] C08G 77/22
U.S. Cl. 528—30 4 Claims

1. A curable organopolysiloxane composition comprising
(i) an organopolysiloxane component having the average unit formula $R_aSiO_{(4-a)/2}$ wherein R is a monovalent hydrocarbon group, a has an average value of from 0.8 to 2.2 and which contains at least 2 lower alkenyl groups having 1 to 6 carbon atoms in each molecule,
(ii) an organopolysiloxane component which contains at least 2 mercaptoalkyl groups in each molecule and, optionally, R groups except alkenyl groups, in a quantity such that the molar ratio of the total quantity of mercaptoalkyl groups in this component to the total quantity of all alkenyl groups in components (i) and (iii) is (0.3:1) to (5.0:1), and
(iii) an organosilicon compound having in each molecule at least 1 Si-bonded aliphatically unsaturated organic group and at least 1 silicon-bonded group selected from the group consisting of alkoxy and alkoxyalkoxy, in a quantity not exceeding one-fifth, as a weight ratio, of the quantity of component (i).

4,889,906
AMINE SALTS OF 1,4,2-OXAZAPHOSPHOLIDINE-4-ACETIC ACID, 2-ALKOXY-2-OXIDES
Donald L. Fields, Jr., Manchester, and Raymond C. Grabiak, Maryland Heights, both of Mo., assignors to Monsanto Company, St. Louis, Mo.
Filed Nov. 25, 1988, Ser. No. 276,009
Int. Cl.[4] C07F 9/15
U.S. Cl. 558—81 6 Claims

1. A compound represented by the formula:



wherein R^4 is an alkyl having from one to about four carbon atoms.

4,889,907
POLYMERIC POLYHYROXY POLYETHER CONTAINING 1,6-DIAZASPIRO-[4.4]NONANE-2,7-DIONE UNITS
Pen C. Wang, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.
Continuation-in-part of Ser. No. 185,574, Apr. 25, 1988, abandoned, which is a continuation-in-part of Ser. No. 172,054, Mar. 23, 1988, and a continuation-in-part of Ser. No. 171,998, Mar. 23, 1988, abandoned. This application Sep. 16, 1988, Ser. No. 245,619
Int. Cl.[4] C08G 59/29, 69/14
U.S. Cl. 528—96 29 Claims

1. A polymeric, polyhydroxy polyether which comprises alternating units of a 2,2-di(oxyphenyl)propane moiety and a 1,6-diazaspiro[4.4]nonane-2,7-dione moiety having oxyaryl-containing substituents on each spiro ring nitrogen atom, said alternating units being connected by 2-hydroxy-1,3-propylene connecting groups.

4,889,908
POLYETHERS AND THEIR USE AS MOLD RELEASE AGENTS FOR PLASTICS
Joachim Franke, Cologne; Wilhelm Goyert, Leverkusen, and Helmut Kipphardt, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany
Filed Sep. 28, 1988, Ser. No. 250,453
Claims priority, application Fed. Rep. of Germany, Oct. 6, 1987, 3733752
Int. Cl.[4] C08G 18/14
U.S. Cl. 521—115 10 Claims

1. A polyether which is prepared by reacting a substituted 1,2-epoxy alkane having at least one alkyl substituent containing at least 8 carbon atoms with at least one polyol corresponding to the formula

$$R(OH)_x \quad (1)$$

wherein
R is an organic radical and
x is an integer having a value of 2 or more, wherein said epoxy alkane is used in an amount sufficient to add two or more moles of said epoxy alkane to said polyol.

4,889,909

THERMOPLASTIC POLYARYLENE ETHERS

Sigmund Besecke, Seeheim-Jugenheim; Joachim Knebel, Darmstadt; Guenter Schroeder, Ober-Ramstadt, and Werner Ude, Darmstadt-Arheilgen, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Filed Jul. 19, 1988, Ser. No. 221,321

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1987, 3725058

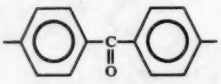
Int. Cl.[4] C08G *8/02*

U.S. Cl. 528—125 **7 Claims**

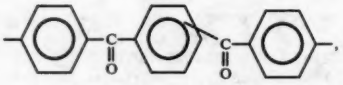
1. A polyarylene ether having therein repeating structural units of the formulas

(—A—O—B—O—) and (—A—O—C—O—),

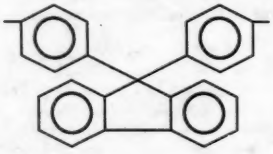
wherein A is 4,4'-benzophenone of the formula



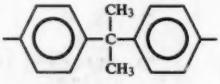
or a mixture of 4,4'-benzophenone and a 4,4''-benzophenone of the formula



B is 9,9-bis-(4'-phenyl)fluorene of the formula



C is 2,2-bis(4-phenyl)propane of the formula



the molar ratio of units (A—O—B—O) to (A—O—C—O) is from 30:70 to 90:10.

4,889,910

PURIFICATION OF CRUDE POLYORGANOPHOSPHAZENES

Serge Bordere, Billere; Guy Pagniez, Poey de Lescar, and Philippe Potin, Billere, all of France, assignors to Atochem, Puteaux, France

Filed Oct. 14, 1988, Ser. No. 257,946

Claims priority, application France, Oct. 14, 1987, 87 14215

Int. Cl.[4] C08G *79/02*

U.S. Cl. 528—168 **16 Claims**

1. A process for the purification of crude polyorganophosphazene elastomers produced by the nucleophilic cosubstitution of polydichlorophosphazenes and contained in a reaction medium which comprises said polyorganophosphazenes, reaction solvent for the cosubstitution reaction, excess nucleophilic reagent or product of neutralization thereof or combination of excess nucleophilic reagent and product of neutralization and any alkali metal salts of neutralization present, said process comprising, in a single treatment zone, both eliminating the reaction solvent and thereafter washing the resulting reaction medium with a liquid which is a nonsolvent for the polyorganophosphazenes, but miscible with the other products present in said reaction medium.

4,889,911

PROCESS FOR THE PRODUCTION OF FULLY AROMATIC, THERMOTROPIC POLYESTERS AND POLYESTER CARBONATES

Harald Pielartzik; Wolfgang Ebert; Rolf-Volker Meyer; Hans-Joachim Traenckner, all of Krefeld, and Edgar Ostlinning, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 11, 1988, Ser. No. 231,071

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1987, 3727730

Int. Cl.[4] C08G *63/38*

U.S. Cl. 528—182 **9 Claims**

1. A process for the production of thermotropic, fully aromatic polyesters and polyesters carbonates by (i) esterification of unsubstituted or substituted p-hydroxybenzoic acids and aromatic dicarboxylic acids with diaryl carbonate at temperatures of 100° to 220° C. and (ii) subsequent transesterification of the aryl esters from (i) with diphenols accompanied by polycondensation, at temperatures in the range from 250° to 330° C. wherein esterification, the transesterification and the polycondensation reactions are carried out in the presence of 0.01 to 5% by weight of at least one heterocyclic compound containing 1 to 3 nitrogen atoms, based on the amount of carboxylic acid reactant

---

4,889,912

ACETYLENE TERMINATED ASPARTIMIDES AND RESINS THEREFROM

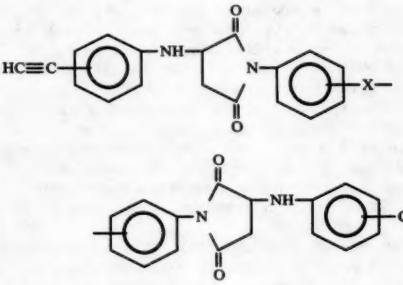
Paul M. Hergenrother, Yorktown; John W. Connell, Newport News, and Stephen J. Havens, Newport News, all of Va., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation-in-part of Ser. No. 87,375, Aug. 20, 1987, abandoned. This application Mar. 24, 1989, Ser. No. 328,392

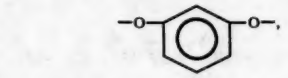
Int. Cl.[4] C08G *73/12*

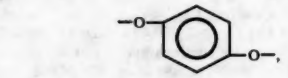
U.S. Cl. 528—125 **22 Claims**

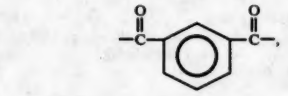
1. The class of acetylene terminated aspartimides having the general formula:

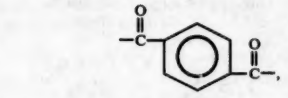


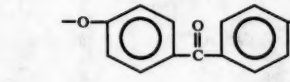
where X is a bond or a divalent radical selected from the group consisting of CH_2, O, S, C=O, SO_2, $C(CH_3)_2$, $C(CF_3)_2$,

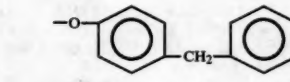


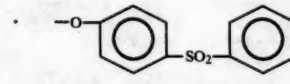


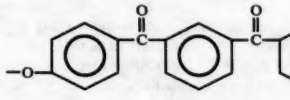




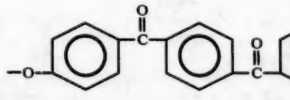








and



4,889,913

POLYMERIZATION OF OLEFIN/CO MIXTURE WITH CATALYST COMPOSITION COMPRISING PHENOLIC COMPOUND

Eit Drent, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Sep. 22, 1988, Ser. No. 247,834

Claims priority, application Netherlands, Sep. 29, 1987, 8702317

Int. Cl.[4] C08G *67/02*

U.S. Cl. 528—392 7 Claims

1. A process for the preparation of polymers which comprises polymerizing a mixture of carbon monoxide with at least one olefinically unsaturated compound with a catalyst composition comprising:

(a) a palladium compound,

(b) an anion of an acid with a pK_a of less than about 4,

(c) a triaryl arsine, and

(d) a compound containing at least one phenolic hydroxyl group.

4,889,914

PREPARATION OF CARBON MONOXIDE/OLEFIN COPOLYMER WITH REMOVAL OF S/FE FROM CARBON MONOXIDE MONOMER

Johannes A. M. Van Broekhoven; Maarten M. Geuze, and James A. Salter, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Jun. 30, 1988, Ser. No. 213,731

Claims priority, application Netherlands, Aug. 25, 1987, 8701981

Int. Cl.[4] C08G *67/02*

U.S. Cl. 528—392 34 Claims

1. A process for preparation of polymers, wherein carbon monoxide containing a second component which is a member of the group consisting of: sulfur and iron, and mixtures thereof, is subjected to one or more purifying treatments wherein the content of the second component is decreased purifying the carbon monoxide, and the carbon thus purified is polymerized together with one or more olefinically unsaturated compounds by contacting with a palladium-containing catalyst composition.

4,889,915

URETHANE ADHESIVES

Melvin Brauer, East Brunswick, and Clayton C. Crawford, Bayonne, both of N.J., assignors to CasChem, Inc., Bayonne, N.J.

Filed Apr. 14, 1987, Ser. No. 38,081

Int. Cl.[4] C08L *75/04*

U.S. Cl. 525—458 21 Claims

1. A composition for forming a urethane adhesive having high green strength comprising:

a polyol;

a thermoplastic polyurethane having a pendent or extra-linear group which contains an aliphatic non-benzenoid

group and which is soluble in methyl ethyl ketone to at least 1 weight percent, said thermoplastic polyurethane present in an amount sufficient to impart tack and green strength to the adhesive; and

an organic isocyanate compound in an amount sufficient to impart curing properties to the composition; wherein one of said polyol and said isocyanate compound is present in a molar excess compared to the other.

4,889,916

PROTEIN LABEL AND DRUG DELIVERY SYSTEM

Beverly Packard; Michael Edidin, both of Baltimore, and Akira Komoriya, Rockville, all of Md., assignors to The Johns Hopkins University, Baltimore, Md.

Division of Ser. No. 799,637, Nov. 19, 1985, Pat. No. 4,751,286. This application Feb. 1, 1988, Ser. No. 151,186

Int. Cl.[4] C07D *311/82;* G01N *33/533;* A61K *39/395;* C07K *15/00*

U.S. Cl. 525—54.1 12 Claims

1. A method of conjugating a protein with a bridging compound having the formula

wherein X and Y comprise separate functional groups reactive

with sulfhydryl groups formed by reduction of disulfide bonds of a protein molecule and A comprises a drug, dye or label portion which is unreactive with sulfhydryl groups, said method comprising the steps of:

(a) reducing the disulfide bonds of said protein;

(b) reacting the bridging compound across the reduced disulfide bonds of said protein; and

(c) oxidizing or alkylating the reduced disulfide bonds remaining after step (b).

4,889,917

PEPTIDE

Masao Tanihara; Kiichiro Oka; Hideaki Yamada; Akira Kobayashi, all of Kurashiki; Toshihide Nakashima, Toyonaka; Yoshiaki Omura, Mitsu, and Koichi Takakura, Nishinomiya, all of Japan, assignors to Agency of Industrial Science Technology, Ministry of International Trade & Industry, Tokyo, Japan

Filed Nov. 1, 1988, Ser. No. 265,550

Claims priority, application Japan, Nov. 25, 1987, 62-295370

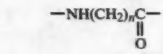
Int. Cl.[4] C07K *7/08, 7/10*

U.S. Cl. 530—324 **3 Claims**

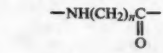
1. A peptide represented by the formula:

H-X-Gly-Trp-Lys-His-Trp-Val-Tyr-Tyr-Thr-Cys-Cys-Pro-Asp-Thr-Pro-Tyr-Leu-Asp-Y-Z

wherein one of X and Y stands for a single bond, an amino acid residue selected from the class consisting of Asp, Glu, Lys and a divalent group represented by the formula,



(wherein n stands for an integer in the range of 1 to 17), or a peptide residue formed by peptide linkage of two to ten amino acid residues of at least one species selected from the class mentioned above and the other of X and Y stands for an amino acid residue selected from the class consisting of Asp, Glu, Lys and a divalent group represented by the formula,



(wherein n stands for an integer in the range of 1 to 17), or a peptide residue formed by peptide linkage of two to ten amino acid residues of at least one species selected from the class mentioned above, and Z stands for one member selected from the class consisting of hydroxyl group and amino group.

4,889,918

PROTEIN TOKIN FROM BACILLUS THIRINGIENSIS WHICH IS TOXIC TO COLEOPTERA

Aloisius Krieg, Darmstadt; Alois Huger, Darmstadt-Eberstadt, and Wolfgang Schnetter, Bammental, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

Division of Ser. No. 259,161, Oct. 18, 1988, which is a division of Ser. No. 195,511, May 18, 1988, Pat. No. 4,851,340, which is a division of Ser. No. 27,991, May 13, 1987, Pat. No. 4,766,203, which is a continuation of Ser. No. 681,918, Dec. 14, 1984, abandoned. This application Nov. 8, 1988, Ser. No. 268,753

The portion of the term of this patent subsequent to Aug. 23, 2005, has been disclaimed.

Int. Cl.[4] C07G *7/00;* **C12P** *21/00*

U.S. Cl. 530—350 **23 Claims**

1. Toxin against Coleoptera which is substantially non-toxic against Lepidoptera and Diptera, said toxin isolated from a *Bacillus thuringiensis* strain and characterized as a protein having a molecular weight of from about 65 to about 70 kilodaltons.

4,889,919

BIOLOGICALLY ACTIVE PDGF DERIVED A-CHAIN HOMODIMERS

Mark J. Murray, and James D. Kelly, both of Seattle, Wash., assignors to ZymoGenetics, Inc., Seattle, Wash.

Continuation-in-part of Ser. No. 896,485, Aug. 13, 1986, Pat. No. 4,766,073, which is a continuation-in-part of Ser. No. 705,175, Feb. 25, 1985, abandoned, which is a continuation-in-part of Ser. No. 660,496, Oct. 12, 1984, Pat. No. 4,769,322. This application Dec. 15, 1986, Ser. No. 942,484

The portion of the term of this patent subsequent to Aug. 23, 2005, has been disclaimed.

Int. Cl.[4] C07K *13/00, 15/14;* **A61K** *37/02*

U.S. Cl. 530—351 **14 Claims**

1. A substantially pure protein having two disulfide-bonded polypeptide chains, each of said chains comprising the amino acid sequence:

V X1 K T R T V I Y E I P R S Q V D P T S A N F L I W F P X2 V E V K R X3 T G X4 X5 X6 T S S V K C Q P S R V H H R S V K V A K V E Y V R K K P K L K E V Q V R L E E H L E C A C A T T S L N P D Y R E

wherein each of X1, X2, X3, X4, X5, and X6 is any amino acid.

4,889,920

INSTANTIZED GELATIN SOLUBLE IN COLD WATER

Alexander Müller, Eberbach, Fed. Rep. of Germany, assignor to Deutsche Gelatinefabriken Stoess & Co. GmbH, Eberbach-/Baden, Fed. Rep. of Germany

Filed Aug. 8, 1988, Ser. No. 229,462

Claims priority, application Fed. Rep. of Germany, Aug. 13, 1987, 3726963

Int. Cl.[4] C09H *3/00, 5/00*

U.S. Cl. 530—355 **8 Claims**

1. A process for producing an instantized gelatin soluble in cold water wherein

a pure gelatin solution without additives and having a water content of at least 35% is sprayed at a temperature in excess of the gelation and solidification temperature on an excess of finely divided solid gelatin particles which contain less than 8% of water,

the particles thus obtained are dried in a fluid bed to a water content of 8 to 13%,

whereupon a portion is withdrawn from the process as final product and is further dried to a water content as required for optimum dissolution to occur in cold water,

while the remainder is first more effectively dried to a water content below 8% and is then recycled into the process.

4,889,921

PRODUCTION OF RAPESEED PROTEIN MATERIALS

Levente L. Diosady, Willowdale; Leon J. Rubin, and Yew-Min Tzeng, both of Toronto, all of Canada, assignors to The University of Toronto Innovations Foundation, Toronto, Canada

Filed Apr. 29, 1987, Ser. No. 43,880

Int. Cl.[4] A23J *1/14*

U.S. Cl. 530—377 **25 Claims**

1. A process for treating meal containing vegetable proteins comprising:

(i) extracting said meal with an alkaline solvent for said vegetable proteins at a pH of from 10 to 12.5 to obtain an extraction solution containing a meal residue;

(ii) removing said meal residue;

(iii) adjusting the pH of said extraction solution by addition of an aqueous acid solution to a value of from 2 to 8 thereby precipitating at least some of said vegetable protein, to obtain an unprecipitated protein fraction in solution and a precipitated protein fraction;

(iv) separating the precipitated protein fraction from the protein fraction in solution; and

(v) separating the unprecipitated protein fraction from the undesirable components in the solution by membrane filtration;

wherein said meal comprises one of defatted rapeseed and canola meal.

4,889,922

MONOCLONAL ANTIBODY SPECIFIC FOR HUMAN COLON FIBROBLAST-DERIVED T-PA

Jon P. Schaumann, Kirkwood; Jitka V. Olander, University City; Nicholaos K. Hrakas, Chesterfield, and Joseph Feder, St. Lousi, all of Mo., assignors to Monsanto Co., St. Louis, Mo.

Division of Ser. No. 896,362, Aug. 13, 1986. This application Jan. 6, 1989, Ser. No. 294,032

Int. Cl.[4] G01N *33/53, 33/544, 3/20*

U.S. Cl. 530—413 **4 Claims**

1. An immunoaffinity chromatography method for purifying t-PA from a biological sample containing t-PA comprising passing said sample through an immunoadsorbent column comprising a monoclonal antibody against human colon fibroblast-derived tissue plasminogen activator and produced by a hybridoma having the characteristics of cell lines 63-4 (ATCC HB 9155), 54-2 (ATCC HB 9157) or 79-7 (ATCC HB 9156) bound to a solid support to thereby selectively adsorb said t-PA.

4,889,923

AZO COMPOUNDS CONTAINING CYANO AND VINYL-SULFONE GROUPS, A PROCESS FOR THEIR PREPARATION AND THEIR USE AS DYESTUFFS

Peter Mischke, Bad Soden am Taunus, and Hans J. Schladetsch, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

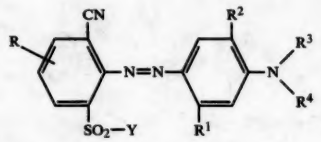
Filed Dec. 16, 1987, Ser. No. 133,555

Claims priority, application Fed. Rep. of Germany, Dec. 19, 1986, 3643386

Int. Cl.[4] D06P *1/38, 3/10;* **C09B** *29/08, 62/51*

U.S. Cl. 534—597 **3 Claims**

1. An azo compound corresponding to the formula (1b)



(1b)

in which

βY is vinyl or β-sulfatoethyl,

R is hydrogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, trifluoromethyl, alkylsulfonyl having 1 to 4 carbon atoms, nitro or cyano,

R^1 is hydrogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, alkanoylamino having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms, alkanoylamino having 2 to 5 carbon atoms or benzoylamino,

R^2 is hydrogen, alkyl having 1 to 4 carbon atoms alkoxy having 1 to 4 carbon atoms, alkoxy which has 2 to 4 carbon atoms and is substituted by alkoxy having 1 to 4 carbon atoms, chlorine or bromine,

R^3 is hydrogen, alkyl having 1 to 4 carbon atoms, alkyl which has 2 to 4 carbon atoms and is substituted by cyano, hydroxy, carboalkoxy having 2 to 5 carbon atoms or alkanoyloxy having 2 to 5 carbon atoms, or alkenyl having 2 to 4 carbon atoms, and

R^4 is hydrogen, alkyl having 1 to 4 carbon atoms, alkyl which has 2 to 4 carbon atoms and is substituted by cyano, hydroxy, carboalkoxy having 2 to 5 carbon atoms or alkanoyloxy having 2 to 5 carbon atoms, or alkenyl having 2 to 4 carbon atoms, cyclohexyl, phenyl or benzyl.

4,889,924

BISAZO COMPOUNDS

Yutaka Akasaki; Akihiko Tokita; Kaoru Torikoshi; Akira Imai, and Touru Ishii, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

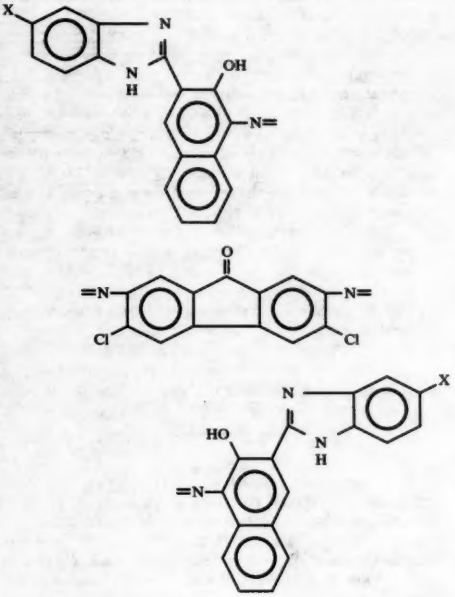
Filed Oct. 2, 1987, Ser. No. 103,875

Claims priority, application Japan, Oct. 2, 1986, 61-233274

Int. Cl.[4] C09B *35/34;* **G03G** *5/04, 5/06;* **H01L** *31/08*

U.S. Cl. 534—658 **4 Claims**

1. A bisazo compound of the formula



wherein X represents —H, —Cl or NO_2.

4,889,925

PROCESS FOR THE PURIFICATION OF ALKYL GLYCOSIDES, PRODUCTS OBTAINABLE BY THIS PROCESS AND THEIR USE

Karl H. Schmid, Mettmann, and Manfred Biermann, Muehlheim, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Feb. 4, 1987, Ser. No. 10,864

Claims priority, application Fed. Rep. of Germany, Feb. 6, 1986, 3603581

Int. Cl.[4] C07H *15/04, 1/06;* **A61K** *7/00;* **C11D** *1/66*

U.S. Cl. 536—18.6 **23 Claims**

1. A method for purifying an alkyl glycoside/fatty alcohol mixture by distillation compromising:

(a) adding to the mixture at least one polar organic viscosity-reducing agent, miscible with the alkyl glycoside, which is color-stable and heat-stable at the distillation temperature and which has a boiling point at least about 50° C. above the boiling point of the fatty alcohol component at 760 mbar, in an amount sufficient to reduce the viscosity of the

mixture to a viscosity of no more than 20,000 mPas under distillation conditions, selected from a group consisting of (1) fatty alcohol ethoxylates containing from 12 to 18 carbon atoms in the fatty alcohol moiety and from 3 to 10 mols of ethylene oxide per mol of fatty alcohol, and (2) 1,2-alkane diols containing from 12 to 18 carbon atoms; and

(b) quantitatively distilling off fatty alcohol from the alkyl glycoside/fatty alcohol mixture at a temperature of up to about 160° C. and at least about 20° C. below the thermal decomposition point of the alkyl glycoside component, and under a pressure of from about 1 to 10^{-3} to substantially eliminate fatty alcohol from the mixture and provide a mixture, with reduced fatty alcohol content, comprising alkyl glycoside and from 10 to 50% by weight of the mixture, with reduced fatty alcohol content, of the at least one polar organic viscosity reducing agent.

10. A composition comprising:

(a) an alkyl glycoside in a quantity of from about 90 to 50% by weight of the composition; and

(b) at least one viscosity-reducing polar organic agent in an amount of from about 10 to 50% by weight of the composition which is heat-stable and color-stable at a temperature of up to about 160° C., which is miscible with the alkyl glycoside, which has a boiling point at 760 mbar of at least 50° C. above the boiling point of the fatty alcohol component of the alkyl glycoside, and which functions in said amount to decrease the viscosity of a mixture consisting essentially of said alkyl glycoside and said fatty alcohol in a weight ratio of from about 1:10 to 2:1 to at most about 10,000 mPas at a temperature of from about 120° C. up to about 160° C., wherein the viscosity-reducing agent is selected from the group consisting of

(1) fatty alcohol ethoxylates containing from 12 to 18 carbon atoms in the fatty alcohol moiety and from 3 to 10 moles ethylene oxide per mole of fatty alcohol, and

(2) 1,2-alkane diols containing from 12 to 18 carbon atoms.

4,889,926

METHOD FOR THE SYNTHESIS OF (2''R)-4'-O-TETRA-HYDROPYRANYLADRIAMYCIM USING 14-CHLORO-DAUNOMYCIN AS AN INTERMEDIATE

Tomoya Machinami, Yokosuka; Takeshi Nakamura, Yokohama; Ken Nishihata, Yokohama; Shinichi Kondo, Yokohama, and Tomio Takeuchi, Tokyo, all of Japan, assignors to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai, Tokyo, Japan

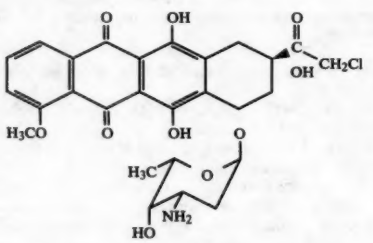
Filed Jun. 9, 1988, Ser. No. 204,363

Claims priority, application Japan, Jun. 12, 1987, 62-145339; Jul. 14, 1987, 62-173924

Int. Cl.[4] C07H *15/24*

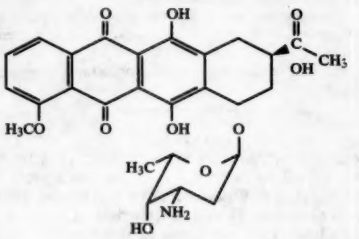
U.S. Cl. 536—6.4 **7 Claims**

1. A process for the preparation of 14-chlorodaunomycin of the formula (I)



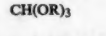
(I)

or an acid addition salt thereof, which comprises reacting daunomycin of formula (II)



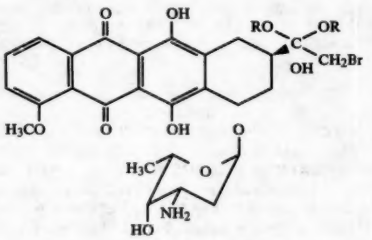
(II)

or an acid addition salt thereof with an alkyl ortho-formate of formula (III)



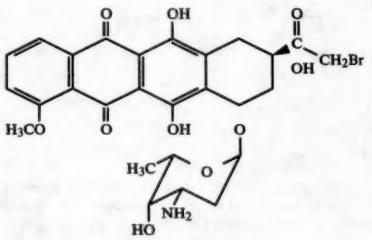
(III)

wherein R is a lower alkyl group, and a brominating agent in solution in an organic solvent to form 14-bromo-13-dialkylketaldaunomycin of formula (IV)



(IV)

wherein R is as defined above, or an acid addition salt thereof, hydrolyzing the compound of formula (VI) by treating with an aqueous solution of an acid under acidic conditions, then adding an excess amount of solid metal chloride to the resulting aqueous reaction mixture containing the acid-addition salt of 14-bromodaunomycin so produced and represented by formula (V)



(V)

to dissolve the solid metal chloride into said aqueous reaction mixture and to react the dissolved metal chloride with 14-bromodaunomycin acid-addition salt so that the 14-bromo group of 14-bromodaunomycin of formula (V) undergoes the halogen-exchange reaction with the metal chloride to produce the acid-addition salt of 14-chlorodaunomycin of formula (I) and concurrently allowing the acid-addition salt of the 14-chlorodaunomycin of formula (I) to be precipitated from the resulting aqueous reaction solution by the salting-out of the 14-chlorodaunomycin acid-addition salt, the amount of said solid metal chloride being such that a part of the metal chloride as dissolved from the added solid metal chloride into said aqueous reaction mixture is sufficient to convert all the 14-bromodaunomycin present into the 14-chlorodaunomycin and

the remaining parts of the dissolved metal chloride are sufficient to cause the resultant 14-chlorodaunomycin acid-addition salt to be precipitated from the reaction solution by the salting-out process, and recovering the acid-addition salt of 14-chlorodaunomycin from the aqueous reaction solution, and when desired, treating the recovered 14-chlorodaunomycin acid-addition salt with an aqueous alkaline compound under weakly alkaline conditions to afford 14-chlorodaunomycin in its free base form.

4,889,927

PRODUCTION PROCESS OF PHENYLGLYCOSIDES

Koji Murakami, Kyoto; Fumiaki Nakatsubo, Takayama; Yoshiaki Katsura, Kyoto, and Motoo Matukura, Tokyo, all of Japan, assignors to Jujo Paper Co., Ltd., Tokyo, Japan

Filed Mar. 3, 1988, Ser. No. 163,839

Claims priority, application Japan, Mar. 4, 1987, 62-49781

Int. Cl.[4] C07H *15/20, 13/06*

U.S. Cl. 536—18.6 **7 Claims**

1. A process for production of 2,6-disubstituted-phenylglycosides, which comprises: reacting a glycose, of which the hydroxy group at the 1 position is substituted by a halogen atom and of which the other hydroxy groups are protected by tertiary acyl groups, a phenol, of which both of the ortho-positions in regard to the phenolic hydroxy group are substituted by substituents and an alkali metal hydride in dimethylsulfoxide or dimethylformamide in the presence or non-presence of a quaternary-ammonium salt; and then hydrolyzing said acyl groups with an alkaline substance.

4,889,928

SUCROSE ALKYL 4,6-ORTHOACYLATES

Philip J. Simpson, Tadley, England, assignor to Tate & Lyle Public Limited Company, England

Continuation-in-part of Ser. No. 97,194, Sep. 16, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 322,695

Claims priority, application United Kingdom, Sep. 17, 1986, 8622345

Int. Cl.[4] C07H *13/04, 15/20;* **C07D** *307/20, 309/12*

U.S. Cl. 536—122 **16 Claims**

1. A process for the preparation of a sucrose 6-acylate which comprises subjecting a sucrose alkyl 4,6-orthoacylate to mild aqueous acidic hydrolysis to provide a mixture of 4- and 6-monoesters of sucrose and then treating the ester mixture with a base to convert the sucrose 4-ester into sucrose 6- ester.

4,889,929

PREPARATION OF 1'-ETHOXYCARBONYL-OXYETHYL ESTERS OF PENICILLINS

Jacob Vaya; David Ladkani; Clara Schoenberger, all of Jerusalem; Joseph Kaspi, Givatayim; Gad Salemnick, Jerusalem; Haim Yellin, Ramat-Gan, and Stephan Cherkez, Ramat-Gan, all of Israel, assignors to Astra Lakemedel Aktiebolag, Sodertalje, Sweden

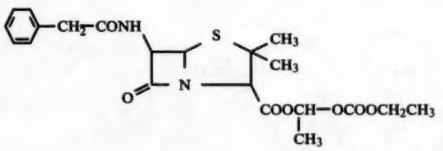
Continuation of Ser. No. 543,252, Oct. 19, 1983, abandoned. This application Mar. 26, 1987, Ser. No. 30,280

Claims priority, application Israel, Jan. 7, 1983, 67637

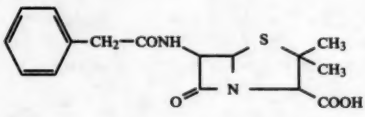
Int. Cl.[4] C07D *499/08*

U.S. Cl. 540—318 **4 Claims**

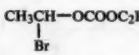
1. A process for the preparation of 1'-ethoxycarbonyloxy ethyl benzyl penicillinate having the formula:



wherein benzyl penicillin having the formula:



or a salt thereof, is reached with 1-bromoethyl ethyl carbonate:



in a non-hydroxylic polar solvent at a temperature of from 20° C. to 50° C.

4,889,930

PROCESS FOR MAKING 2-OXO-1-((SUBSTITUTED SULFONYL)AMINO)CARBONZYL)AZETIDINES AND INTERMEDIATES USED THEREIN

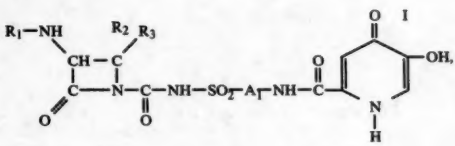
Jollie D. Godfrey, Trenton; Richard H. Mueller, Ringoes, and Robert Zahler, Princeton, all of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Dec. 21, 1987, Ser. No. 135,802

Int. Cl.[4] C07D *705/08, 401/12, 417/14;* **C07B** *51/00*

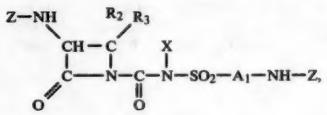
U.S. Cl. 540—363 **14 Claims**

1. A process for making a compound of the formula



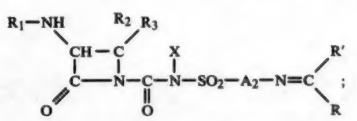
including pharmaceutically acceptable salts thereof, comprising the steps of

(a) treating a compound of the formula



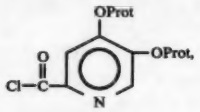
in the presence of a ketonic solvent having the formula

with hydrogen in the presence of a catalyst and thereafter, acylating to provide a compound of the formula



(b) removing the alkylidene or cycloalkylidene group from

compound IV and coupling the so-prepared compound with a compound having the formula



V

wherein Prot is a phenol protecting group,

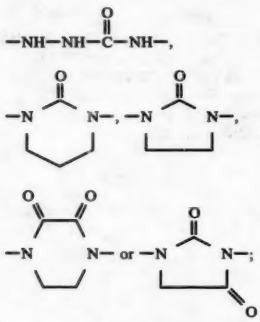
(c) deprotecting the compound formed in step (b) to provide the compounds of formula I:

wherein Z is benzyloxycarbonyl;

X is hydrogen, alkali earth metal or a tri-or tetra-alkylammonium group;

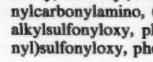
R and R′ are each alkyl or R and R′ taken together with the carbon atom to which they are attached are a 5-, 6- or 7-membered cycloalkylidene group;

wherein A_1 is —HN—,

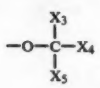


R_1 is an acyl group derived from a carboxylic acid; and,

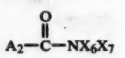
R_2 and R_3 are the same or different and each is hydrogen, alkyl, cycloalkyl, phenyl, substituted phenyl or a 4, 5, 6 or 7-membered heterocycle (hereinafter referred to as R_x), or one of R_2 and R_3 is hydrogen and the other is halomethyl, dihalomethyl, trihalomethyl, alkoxycarbonyl, carboxyl, $—CH_2X_1$ (wherein X_1 is amino, hydroxy, carboxyl, alkoxycarbonyl, alkanoylamino, phenylcarbonylamino, (substituted phenyl)carbonylamino, alkylsulfonyloxy, phenylsulfonyloxy, (substituted phenyl)sulfonyloxy, phenyl, substituted phenyl cyano,



or —O—X_2 (wherein A_2, X_2, X_6 and X_7 are as hereinafter defined)), or —O—X_2 (wherein X_2 is alkyl, substituted alkyl, phenyl, substituted phenyl, phenylalkyl, (substituted phenyl)alkyl, alkanoyl, phenylalkanoyl, (substituted phenyl)alkanoyl, phenylcarbonyl, (substituted phenyl)carbonyl, or heteroarylcarbonyl),



(wherein one of X_3 and X_4 is hydrogen and the other is hydrogen or alkyl, or X_3 and X_4 when taken together with the carbon atom to which they are attached form a cycloalkyl group; and X_5 is formyl, alkanoyl, phenylcarbonyl, (substituted phenyl)carbonyl, phenylalkylcarbonyl, (substituted phenyl)alkylcarbonyl, carboxyl, alkoxycarbonyl, aminocarbonyl, (substituted amino) carbonyl, or cyano),



(wherein A_2 is $—(CH_2)_m—$, $—(CH_2)_m—O—$, or $—(CH_2)_m—NH—$, m is 0, 1 or 2, and X_6 and X_7 are the same or different and each is hydrogen, alkyl, phenyl or substituted phenyl, or X_6 is hydrogen and X_7 is amino, substituted amino, alkanoylamino or alkoxy, or X_6 and X_7 when taken together with the nitrogen atom to which they are attached form a 4, 5, 6 or 7-membered heterocycle);

the terms "alkyl" and "alkoxy" refer to both straight and branched chain groups having 1 to 10 carbon atoms;

the terms "cycloalkyl" and "cycloalkenyl" refer to cycloalkyl and cycloalkenyl groups having 3, 4, 5, 6 or 7 carbon atoms;

the term "substituted alkyl" refers to alkyl groups substituted with 1, 2 or 3 azido, amino, halogen, hydroxy, carboxy, cyano, alkoxycarbonyl, aminocarbonyl, alkanoyloxy, alkoxy, phenyloxy, (substituted phenyl)oxy, alkylsulfinyl, or alkylsulfonyl groups;

the terms "alkanoyl", "alkenyl", and "alkynyl" refer to both straight and branched chain groups having 2 to 10 carbon atoms;

the terms "halogen" and "halo" refer to fluorine, chlorine, bromine and iodine;

the term "substituted phenyl" refers to a phenyl group substituted with 1, 2 or 3 amino, halogen, hydroxyl, trifluoromethyl, alkyl (of 1 to 4 carbon atoms), alkoxy (of 1 to 4 carbon atoms), alkanoyloxy, aminocarbonyl, or carboxy groups;

the expression "a 4, 5, 6 or 7-membered heterocycle" refers to substituted and unsubstituted, aromatic and non-aromatic heterocycle groups, wherein each may contain 1, 2 or 3 nitrogen or oxygen atoms and wherein substituents are selected from oxo, halogen, hydroxy, nitro, amino, cyano trifluoromethyl, alkyl of 1 to 4 carbons, alkoxy of 1 to 4 carbons, alkylsulfonyl, phenyl, substituted phenyl 2-furfurylideneamino benzylideneamino and substituted alkyl groups wherein the alkyl group has 1 to 4 carbons, wherein said aromatic groups are selected from pyridinyl, furanyl, pyrrolyl, 1,2,3-triazolyl, 1,2,4-triazolyl, imidazolyl, pyrimidinyl, oxazolyl, triazinyl, and tetrazolyl; and said nonaromatic groups are selected from azetidinyl, oxetanyl, piperidinyl, piperazinyl, imidazolidinyl, oxazolidinyl, pyrrolidinyl, tetrahydropyrimidinyl and hexahydroazepinyl.

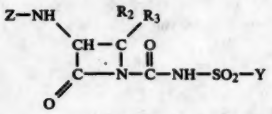
10. A process of claim **1** wherein the compounds of formula II are prepared by

treating a compound of the formula

with a nitrosating reagent, followed by reduction and reaction with a compound of the formula

followed by treatment with an acid to provide a compound of the formula

which is reacted with a compound of the formula



wherein Y is a leaving group, in the presence of a tertiary alkylamine and a solvent to provide compounds of formula II wherein X is hydrogen or an alkaline earth metal; and,

treating a so-formed compound with a tri- or tetra-alkylammonium sulfate to provide compounds of formula II wherein X is a tri- or tetra-alkylammonium group.

4,889,931

MANGANESE (II) CHELATE MANUFACTURE

Scott M. Rocklage, Saratoga; William P. Cacheris, Sunnyvale, and Gene Jamieson, Boulder Creek, all of Calif., assignors to Salutar, Inc., Sunnyvale, Calif.

Filed Sep. 27, 1988, Ser. No. 249,744
Int. Cl.[4] C07F *11/00*
U.S. Cl. 540—465 **16 Claims**

1. A process for manufacturing Mn(II) chelates comprising reacting a substantially protonated, insoluble chelating compound having acidic protons with MnO in water to form a substantially protonated Mn(II) chelate precipitate, with the proviso that the chelating compound is a compound other than EDTA or DTPA.

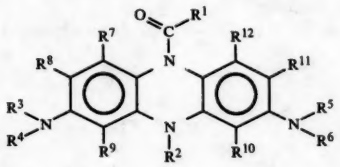
4,889,932

STABILIZED LEUCO PHENAZINE DYES AND THEIR USE IN AN IMAGING SYSTEM

Alan G. Miller, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 911,260, Sep. 15, 1986, abandoned, which is a continuation-in-part of Ser. No. 656,587, Oct. 1, 1984, abandoned. This application Feb. 8, 1988, Ser. No. 153,264
Int. Cl.[4] C07D *241/46;* B41M *5/26, 5/12;* C09B *17/02*
U.S. Cl. 544—348 **5 Claims**

1. A leuco phenazine dye having the structural formula:



wherein R^1 represents a member selected from the group consisting of:

I. aryl groups having up to 10 carbon atoms and containing from 1 to 5 electron withdrawing substituents, wherein said electron withdrawing substituents are selected from the group consisting of either:

A. sustituents which are overall electron withdrawing independent of their position on the aryl radical, said electron withdrawing substituents being selected from the group consisting of:

1. $-SO_2R_{17}$

2. trifluoroalkyl groups having up to 10 carbon atoms

II. alkyl groups selected from the group consisting of $-CH_2Cl$ and $-CHCl_2$,

R_2 represents a member selected from unsubstituted alkyl and aryl groups having up to 10 carbon atoms and substituted alkyl and aryl groups having up to 10 carbon atoms, wherein said substituents on said alkyl groups can be methoxy groups and said substituents on said aryl groups can be selected from the group consisting of methoxy and methyl,

R_3, R_4, R_5 and R_6 independently represent members selected from the group consisting of:

and substituted and unsubstituted alkyl groups having 1 to 6 carbon atoms wherein said substituents are selected from the group consisting of halogens, —CN, hydroxy, and alkoxy having 1 to 10 carbon atoms,

R^7, R^8, R^9, R^{10}, R_{11} and R^{12} independently represent members selected from the group consisting of hydrogen, halogen, unsubstituted alkyl groups, unsubstituted alkoxy groups having up to 4 carbon atoms, substituted alkyl groups having up to 4 carbon atoms, and substituted alkoxy groups having up to 4 carbon atoms, wherein said substitutents are selected from halogen, and

R^{17} represents a member selected from the group consisting of unsubstituted alkyl and aryl groups having up to 10 carbon atoms.

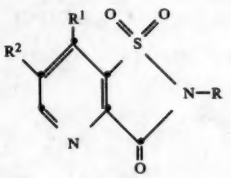
4,889,933

4-AZASACCHARINES, 4-AZA-DIHYDRO- OR -TETRAHYDRO-SACCHARINES

Adrian Waldner, Allschwil, and Willy Meyer, Riehen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Sep. 12, 1988, Ser. No. 242,834
Claims priority, application Switzerland, Sep. 18, 1987, 3620/87
Int. Cl.[4] A61K *31/535, 31/44;* C07D *417/14, 417/02*
U.S. Cl. 546—114 **6 Claims**

1. A compound of formula I



(I)

in which R is H, linear or branched C_1–C_{20}alkyl, C_2–C_{20}alkenyl or C_2–C_{20}alkynyl, C_3–C_{10}cycloalkyl, C_4–C_{20}cycloalkylalkyl, C_4–C_{20}alkylcycloalkyl, C_5–C_{20}-alkylcycloalkylalkyl, C_6–C_{14}aryl, C_7–C_{20}-aralkyl, or -alkaryl or C_8–C_{20}-alkaralkyl, each of which is unsubstituted or substituted by —OH, —CN, halogen, C_1–C_{12}-alkoxy or -alkylthio, C_6–C_{10}aryl-oxy or -thio, C_7–C_{16}-aralkyloxy, -alkaryloxy, -aralkylthio or -alkarylthio, C_8–C_{18}alkaralkyloxy or -thio, $-NR^3R^4$, $-COOR^5$, $-O-COR^6$, $-CONR^3R^4$ or by $-NR^3COR^6$, in which each of R^3 and R^4, independently of the other, is C_1–C_{12}alkyl, C_5- or C_6-cycloalkyl, C_6–C_{10}aryl, C_7–C_{16}aralkyl or C_8–C_{16}alkaralkyl or R^3 and R^4 together are tetra- or penta-methylene or 3-oxapentylene, R^5 is H, C_1–C_{12}alkyl, phenyl, benzyl, cyclohexyl, or cyclopentyl and R^6 is C_1–C_{12}-acyl, R^1 is H, or linear or branched C_1–C_{12}alkyl which is unstubstituted or substituted by hydroxy, halogen, cyano, C_1–C_4alkoxy, carboxy, C_1–C_{12}-acyloxy or by C_1–C_4alkoxycarbonyl, R^2 is H, or C_1–C_{12}-alkyl or -alkoxy, C_6–C_{10}-aryl or -aryloxy, C_7–C_{16}-aralkyl, -alkaryl, -alkaryloxy or -aralkyloxy, or C_8–C_{16}alkaralkyloxy, which are unsubstituted or substituted by hydroxy, halogen, cyano, C_1–C_4alkoxy, carboxy, C_1–C_{12}acyloxy or by C_1–C_4alkoxycarbonyl wherein all aryl moieties are carbocyclic.

4,889,934

ORGANIC MIXED COMPLEX

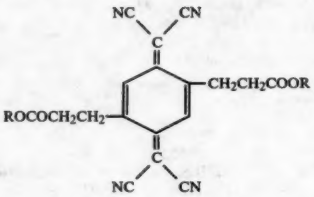
Takeo Kawabata, Hirakata; Masahiko Miyashita, Takatsuki, and Akira Taisha, Ibaraki, all of Japan, assignors to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Jan. 26, 1988, Ser. No. 147,407
Claims priority, application Japan, Jan. 27, 1987, 62-16358
Int. Cl.[4] C07D *217/10*
U.S. Cl. 546—151 2 Claims

1. A organic mixed complex of the formula

$$D^{+}[A{\cdot}TCNQ]$$

wherein D^+ is an N-alkylonium cation of a nitrogen-containing heterocyclic compound (D) selected from the group consisting of pyridines, quinolines, isoquinolines and imidazoles, and [A·TCNQ] is an anion radical of 2,5-bis[(alkoxycarbonyl)ethyl]-7,7,8,8-tetracyanoquinodimethane (A) of the formula



in which R is an alkyl group containing 1–10 carbon atoms, and 7,7,8,8-tetracyanoquinodimethane (TCNQ).

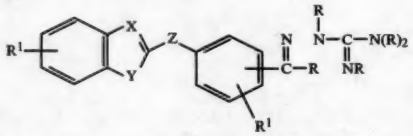
4,889,935

AMINOGUANIDINE DERIVATIVES

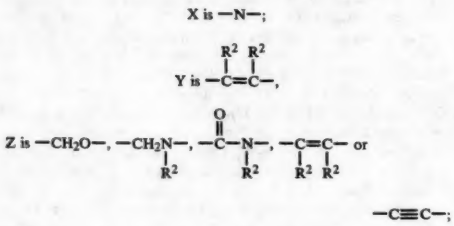
John H. Musser, Malvern, Pa., assignor to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 134,672, Dec. 18, 1987. This application Jun. 30, 1989, Ser. No. 374,114
Int. Cl.[4] C07D *215/14, 215/12*
U.S. Cl. 546—176 2 Claims

1. A compound having the formula



wherein



R is hydrogen, lower alkyl, phenyl or benzyl;
R^1 is hydrogen, lower alkyl, trifluoromethyl, amino, mono- or di- lower alkylamino, nitro, hydroxy, carboxy, lower alkoxycarbonyl, lower alkoxy or halo;
R^2 is hydrogen or lower alkyl;
and the pharmaceutically acceptable salts thereof.

2. The compound of claim 1, having the name 2-[1-[3-(2-quinolinylmethoxy)phenyl]ethylidene]hydrazinecarboximidamide.

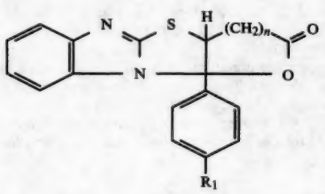
4,889,936

PROCESS FOR PREPARING THIAZOLOBENZIMIDAZOLES AND INTERMEDIATES USED THEREIN

Robin G. Shepherd, Windsor, England; Sie-Yearl Chai, Collegeville, Pa.; Maynard E. Lichty, and Arnold S. Milowsky, both of Coatesville, Pa., assignors to John Wyeth & Brotyher Limited, Maidenhead, England

Division of Ser. No. 133,823, Dec. 23, 1987, Pat. No. 4,812,574. This application Jan. 10, 1989, Ser. No. 295,410
Claims priority, application United Kingdom, Jan. 21, 1987, 8701228
Int. Cl.[4] C07D *513/14*
U.S. Cl. 548—149 2 Claims

1. A compound of formula III



III

wherein n is 1 or 2 and R_1 is hydrogen, halogen, lower alkyl, lower alkoxy or trifluoromethyl.

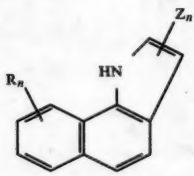
4,889,937

NEW INDOLE DERIVATIVES AND PROCESS FOR PRODUCING THEM

Yoshinobu Nagawa; Koichi Honda, both of Tsukuba, and Hiroshi Nakanishi, Tsuchiura, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

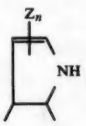
Filed Aug. 29, 1988, Ser. No. 237,465
Claims priority, application Japan, Sep. 16, 1987, 62-231391
Int. Cl.[4] C07D *209/80, 487/00*
U.S. Cl. 548—420 2 Claims

1. New indole derivatives of the following general formula (I):



(I)

wherein R represents a hydrogen atom, or



group ortho-condensed with the naphthalene ring, n represents a number of 1 or 2, and when n is 2, two R groups may be either the same or different from each other; Z each represent

a hydrogen atom, carboxylic acid alkyester group, n represents a number of 1 or 2.

4,889,938

1,4-OXATHIANONES AND 1,4-OXATHIEPANONES

Ulrich Kristen, Riehen, Switzerland, and Hermann O. Wirth, Bensheim, Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

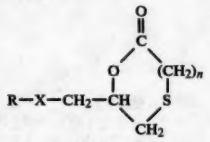
Filed Aug. 8, 1988, Ser. No. 229,392

Claims priority, application Switzerland, Aug. 12, 1987, 3097/87

Int. Cl.[4] C07D *327/06, 327/02*

U.S. Cl. 549—10 **7 Claims**

1. A compound of the formula



(I)

in which R is C_1–C_{24}alkyl, C_3–C_{20}alkenyl, C_5–C_6cycloalkyl, unsubstituted or C_1–C_4alkyl-substituted phenyl or phenyl-C_1–C_4alkyl, n is 1 or 2, X is O or S.

4,889,939

FLUOROPOLYETHERS CONTAINING END GROUPS ENDOWED WITH ANCHORING CAPACITY

Gerardo Caporiccio, Milan; Ezio Strepparola, Treviglio, and Mario A. Scarati, Milan, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Division of Ser. No. 31,180, Apr. 12, 1988, Pat. No. 4,757,145, which is a continuation of Ser. No. 687,729, Dec. 31, 1984, abandoned. This application Apr. 11, 1988, Ser. No. 179,876

Claims priority, application Italy, Jun. 19, 1984, 21480 A/84

Int. Cl.[4] C07C *43/11, 43/12*

U.S. Cl. 549—13 **5 Claims**

1. Compounds having the formula:

(I) $RO—(C_3F_6O)_m—(CFXO)_n—CFX—L$; or

(II) $R''CFXO—(C_3F_6O)_x(CFXO)_y—(C_2F_4O)_z—CFX—L$, the oxyalkylene groups being randomly distributed in the perfluoropolyether chain where:

R=—CF_3, —C_2F_5, —C_3F_7

X=F, —CF_3

R''=F, —CF_3, —C_2F_5 and when x=O, —L

m=an integer from 3 to 100

n=a finite integer, or =0, and m+n is from 3 to 100, provided that, if n is finite, m/n ranges from 5 to 20 and R is =CF_3, and if n=zero it is —C_2F_5, —C_3F_7

x=a finite integer, or=zero

y,z=finite integers, such that x+y+z ranges from 5 to 200, while (x+y)/y ranges from 5 to 0.5, provided that when x=zero, z/y ranges from 1 to 0.5, and y+z ranges from 5 to 200, while X is F

L=a group Y—Z, where

Y=—CH_2O—, CH_2OCH_2—, —CF_2—, —CF_2O—

Z=an organic, non-aromatic, non-fluorinated radical free from active hydrogen atoms, containing two or more electron-doublets-donor heteroatoms and capable of giving rise to coordinative bonds or to charge transfer bonds, thus causing adsorption phenomena of various kinds on metal, polymeric or ceramic surfaces, said heteroatoms being selected from the group consisting of O and S, one heteroatom being in position 1-3 or 1-4 or 1-5 with respect to the other heteroatom.

4,889,940

PROCESS FOR PREPARING THIOPHENE DERIVATIVES

Peter R. Grosvenor, Wolverhampton, and Lance S. Fuller, Acton Trussell, both of England, assignors to Shell Internationale Research Maatschappij B.V., The Hague, Netherlands

Filed Jun. 13, 1988, Ser. No. 205,647

Claims priority, application United Kingdom, Jul. 14, 1987, 8716587

Int. Cl.[4] C07D *333/28*

U.S. Cl. 549—81 **10 Claims**

1. A process for the preparation of thiophene derivative which is substituted at the beta-position by a bromine atom, which comprises reacting the corresponding beta-unsubstituted thiophene with an aromatic compound which is substituted with a bromine atom, in the presence of an alkali metal amide and a catalyst which is capable of forming a complex with the cation of the alkali metal amide, at a temperature in the range of from 10° to 90° C.

4,889,941

SYNTHETIC FLAVONOIDS AS INHIBITORS OF LEUKOTRIENES AND 5-LIPOXYGENASE

Edwin S. Wu, and Alexander Kover, both of Rochester, N.Y., assignors to Fisons Corporation, Rochester, N.Y.

Continuation-in-part of Ser. No. 41,817, Apr. 23, 1987, abandoned. This application Dec. 4, 1987, Ser. No. 129,014

Int. Cl.[4] C07D *311/30*

U.S. Cl. 549—403 **1 Claim**

1. The compound 7-[3-[(3,4-dihydroxyphenethyl)amino]-2-hydroxypropoxy]flavone hydrobromide.

4,889,942

PROCESS FOR SYNTHESIS OF ACYLAMINO ORGANOSILICON COMPOUNDS

Beth I. Gutek, Freeland, and Antony P. Wright, Rhodes, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Apr. 12, 1989, Ser. No. 336,938

Int. Cl.[4] C07F *7/10*

U.S. Cl. 556—419 **20 Claims**

1. A method for preparing an organosilicon compound containing at least one silicon-bonded acylamino-substituted hydrocarbon radical comprising: reacting an acyl halide with an aminosilicon compound having at least one silicon-bonded amino-substituted hydrocarbon radical containing at least one nitrogen-bonded hydrogen, all other silicon valences therein being satisfied by radicals selected from the group consisting of organic radicals and divalent, silicon-linking, oxygen atoms, in the presence of a solid base selected from group consisting of a tertiary aliphatic amine resin, a tertiary aromatic amine resin, an inorganic supported base, a polystyrene ion exchange resin bearing dimethylamino groups, a polystyrene ion exchange resin bearing trimethylammonium hydroxide groups and a polyvinyl pyridine.

4,889,943

METHOD FOR STABILIZING AQUEOUS PHOSPHOENOLPYRUVIC ACID SOLUTION

Hirotaka Kawamura; Norio Ohtsu, both of Ube, and Shinichiro Utiumi, Tokyo, all of Japan, assignors to Ube Industries, Ltd., Ube, Japan

Filed Nov. 30, 1987, Ser. No. 126,602

Claims priority, application Japan, Dec. 5, 1986, 61-288937; Dec. 12, 1986, 61-294750

Int. Cl.[4] C07C *9/09*; A61B *19/00*

U.S. Cl. 558—71 **12 Claims**

1. A method for stabilizing an aqueous solution of phosphoenolpyruvic acid or its sodium salt, which comprises admixing NaOH with said aqueous solution in an amount such that the pH of the resultant solution is from 10 to 13.

4,889,944

NOVEL N-ALKYL OR N-ALKENYL-N-(O,O-DISUBSTITUTED-THIO-PHOSPHORYL)-N',N'-DISUBSTITUTED GLYCIN AMIDES, PROCESS FOR THE PREPARATION THEREOF AND ACARICIDE, INSECTICIDE AND FUNGICIDE CONTAINING THESE COMPOUNDS AS ACTIVE INGREDIENT

Karoly Balogh; Zsolt Dombay; Karoly Fodor; Erzebet Grega nee Toth; Ernó Lórik; Magdolna Magyar née Tömörkényi; Jozsef Nagy; Károly Pásztor; Pál Sántha; Gyula Tarpai; István Tóth, all of Miskolc, and Eszter Urszin née Simon, Sajobabony, all of Hungary, assignors to Eszakmagyarorszagi Vegyimuvek, Sajobabony, Hungary

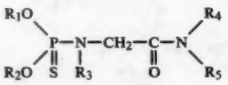
Continuation-in-part of Ser. No. 780,659, Sep. 26, 1985. This application Nov. 25, 1987, Ser. No. 126,218

Claims priority, application Hungary, Sep. 26, 1984, 3631/84

Int. Cl.[4] A01N *57/02*

U.S. Cl. 558—171 13 Claims

1. A compound of the formula I



(I)

wherein

R_1 and R_2 are the same or different and stand for alkyl having 1 to 4 carbon atoms unsubstituted or substituted by at least one halogen, alkenyl having 2 to 6 carbon atoms, cycloalkyl having 3 to 6 carbon atoms, phenyl or lower alkoxy-alkyl group, stands for alkyl having 1 to 6 carbon atoms or alkenyl having 2 to 6 carbon atoms.

R_4 and R_5 are the same or different and represent hydrogen, alkyl having 1 to 6 carbon atoms, alkenyl having 2 to 6 carbon atoms, cycloalkyl having 3 to 6 carbon atoms, phenyl, benzyl, phenyl substituted by at least one alkyl having 1–3 carbon atoms or by at least one halogen, or trifluoromethyl group, or are lower alkoxy-alkyl, or a group of the formula $-(CH_2)_n-R_6$, wherein n is an integer between 0 to 3 and R_6 stands for a 3 to 7 membered saturated or unsaturated ring comprising 1 to 3 heteroatoms, said heteroatoms can be selected from the group of nitrogen, oxygen and sulphur, or R_4 and R_5 can together form with the adjacent nitrogen atom a hexamethyleneimino group.

4,889,945

ORGANIC COMPOUNDS

Achim Wiedemann, Weil am Rhein, Fed. Rep. of Germany, assignor to Sandoz Ltd., Basel, Switzerland

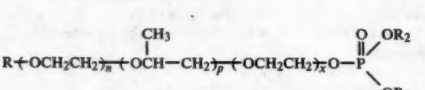
Division of Ser. No. 112,790, Oct. 23, 1987, Pat. No. 4,830,764. This application Apr. 6, 1989, Ser. No. 334,645

Claims priority, application Fed. Rep. of Germany, Oct. 27, 1986, 3636543

Int. Cl.[4] D06M *1/00*

U.S. Cl. 558—186 10 Claims

1. A compound of formula I

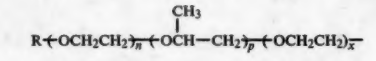


(I)

wherein

each R, independently, is linear or branched C_{9-16}alkyl or C_{9-16}alkenyl;

R_1 has one of the significances given for R_2 or is a radical of formula



each R_2, independently, is hydrogen, alkali metal, ammonium or an equivalent of an alkaline earth metal;

each n, independently, is 2 to 10,

each p, independently, is 1 to 5, and

each x, independently, is 2 to 7 or a mixture of such compounds.

4,889,946

PHENOXYBENZOIC ACID COMPOUNDS AND HERBICIDAL AND PLANT GROWTH REGULANT COMPOSITIONS

Heinz Förster, Wuppertal; Ludwig Eue, Leverkusen; Robert R. Schmidt, Cologne, and Klaus Lürssen, Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

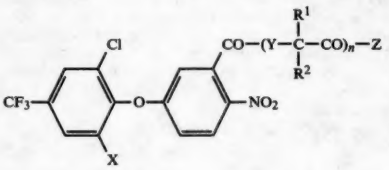
Division of Ser. No. 211,990, Dec. 1, 1980, abandoned. This application Aug. 4, 1982, Ser. No. 404,948

Claims priority, application Fed. Rep. of Germany, Dec. 14, 1979, 29504016

Int. Cl.[4] C07C *79/46*

U.S. Cl. 560—21 22 Claims

1. Phenoxybenzoic acid compound of the formula



(I)

wherein

R^1 and R^2 are independently selected from hydrogen and methyl;

n is 0 or 1;

X is hydrogen or chlorine;

Y is oxygen, sulfur, imino (NH) or alkylimino (N-alkyl); and

Z is the radical

wherein

R^3 and R^4 are individually selected from optionally substituted alkyl, alkenyl, alkynyl, aryl, aralkyl and cycloalkyl, with the proviso that R^3 and R^4 can be optionally substituted alkenyl or alkynyl only when n is 1; or

R^3 and R^4 together with the N atom to which they are bonded, represent an optionally substituted, saturated or unsaturated, optionally benzo-fused mono- or bicyclic radical which optionally contains 1 to 3 further N atoms or an oxygen or sulfur atom as hetero-atoms.

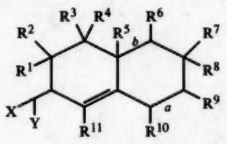
4,889,947

ULTRAVIOLET RADIATION ABSORBING NAPHTHALENYLIDENE COMPOSITIONS

Charalambos J. Phalangas, and Thomas P. Cleary, both of Wilmington, Del., assignors to ICI Americas Inc., Wilmington, Del.

Filed Jul. 28, 1988, Ser. No. 225,295
Int. Cl.[4] C07C *69/608*
U.S. Cl. 560—119 4 Claims

1. A compound of the formula:



[II]

wherein:

X and Y are independently selected from —H, —CN, —$COOR^{12}$, —$CONHR^{12}$, —$CON(R^{12})_2$, —$PhCOOR^{12}$, —$PhCOR^{12}$, —$PhOR^{12}$, —$PhN(R^{12})_2$, [or wherein only one X or Y is substituted by —H,] provided that only one of X and Y can be —H; and

R^1–R^{11} are selected from H, —OH, —$COOR^{12}$, alkyl, alkoxy, or hydroxyalkyl groups having 1–5 carbon atoms and R^{12} is selected from H, alkyl, alkylaryl or arylalkyl groups of 1–22 carbon atoms, and Ph is a benzene ring; and

wherein one of a and b is a double bond and the other is a single bond.

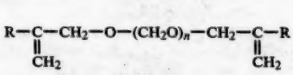
4,889,948

ACRYLATE ESTER ETHER DERIVATIVES

Lon J. Mathias, Hattiesburg, Miss., and Selim H. Kusefoglu, Ann Arbor, Mich., assignors to University of Southern Mississippi, Hattiesburg, Miss.

Filed Aug. 18, 1987, Ser. No. 86,589
Int. Cl.[4] C07C *69/73*
U.S. Cl. 560—181 7 Claims

1. A vinyl monomer of the formula:



wherein n is an integer from 0 to 4 and R is a member selected from the group consisting of carboxy, carboxyalkyl, carbonylalkyl, cyano, carboxamide, and substituted carboxamide.

4,889,949

CATALYTIC (CO)DIMERIZATION OF ALKYL ACRYLATES

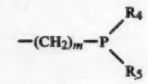
Pierre Grenouillet, Fontaines Sur Saone; Denis Neibecker, Neuves-Maisons, and Igor Tkatchenko, Caluire, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Division of Ser. No. 28,569, Mar. 20, 1987, Pat. No. 4,786,623.
This application Jun. 28, 1988, Ser. No. 212,678
Claims priority, application France, Mar. 27, 1986, 86 04644
Int. Cl.[4] C07C *67/343*
U.S. Cl. 560—202 13 Claims

1. A process for the dimerization of an alkyl acrylate, or codimerization thereof with a conjugated diene, comprising contacting such acrylate or acrylate/diene with a catalytically effective amount of a catalytic composition of matter, comprising (a) at least one non halogenated palladium source, (b) at least one hydrogenophosphonium salt having the formula:

$$[HPR_1R_2R_3]^+Y^-$$

and, optionally, (c) a hydracid HY, wherein R_1, R_2, and R_3 are independently an alkyl, cycloalkyl, aryl, alkoxy, cycloalkoxy or aryloxy radical, with the proviso that one of the radicals R_1, R_2 or R_3 can be a monovalent radical having the formula (II):



in which m is an integer ranging from 1 to 4 and Y^- is an anion which does not coordinate with palladium ions.

4,889,950

PREPARATION OF CARBOXYLIC ESTERS

Kaspar Bott, Mannheim; Horst Hartmann, Boehl-Iggelheim, and Josef Guth, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 24, 1988, Ser. No. 235,610
Claims priority, application Fed. Rep. of Germany, Aug. 25, 1987, 3728242
Int. Cl.[4] C07C *69/52*
U.S. Cl. 560—205 4 Claims

1. A process for preparing a carboxylic ester by reacting a carboxylic acid with a low-boiling alcohol, which comprises charging the reaction mixture to a 1st distillation column, withdrawing the reaction components carboxylic ester, water and unconverted alcohol, but not unreacted carboxylic acid, as overhead product and charging this overhead product to a 2nd distillation column, from which

(a) the overhead product comprises the alcohol or an azeo-ester, this overhead product being recycled into the esterification reaction,

(b) a liquid side product comprising carboxylic ester and water is withdrawn from the stripping section and separated in a phase separating vessel into water and carboxylic ester and the carboxylic ester is returned into the distillation column below the side takeoff point, and

(c) the bottom product removed is the carboxylic ester.

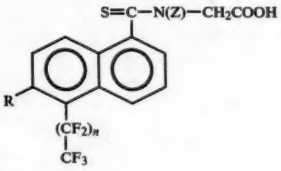
4,889,951

PERFLUOROALKYLATION PROCESS

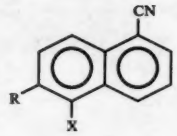
Robert I. Davidson, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 808,204, Dec. 12, 1985, Pat. No. 4,822,904.
This application Apr. 25, 1988, Ser. No. 185,399
Int. Cl.[4] C07C *121/62*
U.S. Cl. 562—427 5 Claims

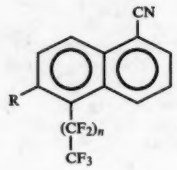
1. In a process for preparing a thioamide-acid corresponding to the formula:



by (A) reacting a halocyanonaphthalene corresponding to the formula:



with a perfluoroalkanoate to replace the X with a perfluoroalkyl group, (B) hydrolyzing the perfluoroalkylated nitrile to the corresponding acid, (C) halogenating the acid to the corresponding acid halide, (D) reacting the acid halide with a saturated hydrocarbyl ester of an acid corresponding to the formula $ZNHCH_2COOH$ to form an amide-ester, (E) thiating the amide-ester, and (F) subjecting the product to saponification and hydrolysis to form the thioamide-acid, the improvement which comprises conducting the perfluoroalkylation by reacting the halocyanonaphthalene with at least about one equivalent of a potassium perfluoroalkanoate corresponding to the formula $KOOC(CF_2)_nCF_3$, wherein n is an integer of 1–16, at about 130°–160° C. in the presence of about 0.5–5 equivalents of cuprous iodide in a dipolar aprotic solvent so as to form a perfluoro-alkylnaphthalene corresponding to the formula:



in which substituted naphthalene formulas R is an alkoxy substituent containing 1–6 carbons, X is bromo or iodo, Z is an alkyl group containing 1–6 carbons, and n is an integer of 1–16.

4,889,952

(PHENYLETHENYL) PHENYLPROPIONALDEHYDE AND METHOD FOR PRODUCING (BENZOLYPHENYL) PROPIONIC ACID USING THE SAME

Isoo Shimizu; Yasuo Matsumura, both of Yokohama, and Yutaka Arai, Tokyo, all of Japan, assignors to Nippon Petrochemical Company, Ltd., Japan

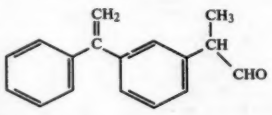
Filed Mar. 11, 1988, Ser. No. 166,633

Claims priority, application Japan, Mar. 12, 1987, 62-57098

Int. Cl.[4] C07C *59/76*

U.S. Cl. 562—460 **19 Claims**

1. α-(3-(1-Phenylethenyl)phenyl)propionaldehyde which is represented by the following formula (I):



(I)

4,889,953

GLYCEROL DERIVATIVES, THEIR PRODUCTION AND USE

Keizo Inoue, Tokyo; Hiroaki Nomura, and Tetsuya Okutani, both of Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

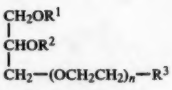
Filed Jul. 22, 1987, Ser. No. 76,527

Claims priority, application Japan, Jul. 22, 1986, 61-173227; Mar. 5, 1987, 62-51049

Int. Cl.[4] C07C *93/04*

U.S. Cl. 564—293 **6 Claims**

1.A compound of the formula:



wherein R_1 is a C_{3-22} alkyl group which may be substituted by (i) C_{3-8} cycloalkyl, (ii) phenyl being unsubstituted or substituted by C_{1-4} alkyl, C_{1-4} alkoxy, hydroxy, nitro or halogen, (iii) halogen, (iv) cyano, (v) ethynyl, (vi) 1 propynyl, (vii) oxo or (viii) C_{1-4} alkoxy, or a group represented by the formula: $-(CH_2)_m-(CQ_2)_p-CQ_3$ wherein Q is halogen, m and p are independently an integer of 0 or more and m+p is 7 to 21; R^2 is (i) hydrogen, (ii) a C_{1-5} alkyl group which may be substituted by C_{2-4} alkanoyl, carboxyl group which may be substituted by C_{2-4} alkanoyl or (iv) an N-(C_{1-4} alkyl)thiocarbamoyl; R^3 is a group represented by the formula:

wherein R^4 and R^5 are independently hydrogen of a C_{1-5} alkyl group, or R^4 and R^5 taken together with the adjacent nitrogen atom form pyrrolidino, piperidino, piperazino or morpholino, each of said groups being unsubstituted or substituted by C_{1-4} alkyl, hydroxy, hydroxyethyl, aminoethyl, carbamoyl or ureido, or a group represented by the formula:

wherein R^4, R^5 and R^6 are independently hydrogen or a C_{1-5} alkyl group, or

means a cyclic ammonium group chosen from the group consisting of pyridinio, oxazolio, thiazolio, pyridazinio, quinolinio, isoquinolinio, 1-(C_{1-4}alkyl)pyrrolidino, 1-(C_{1-4} alkyl)piperidinio, N-(C_{1-4} alkyl)morpholinio or 1-(C_{1-4} alkyl piperazinio, each of said groups being unsubstituted or substituted by C_{1-4} alkyl, hydroxy, hydroxethyl, aminoethyl, carbamoyl or ureido; and n is 2 or 3 or a pharmaceutically acceptable salt thereof.

4,889,954

AMINE OXIDE PROCESS

Kathleen S. Laurenzo, and Dennis P. Bauer, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Jun. 30, 1988, Ser. No. 213,685
Int. Cl.[4] C07C *135/02*
U.S. Cl. 564—298 21 Claims

1. A process for making an amine oxide, said process comprising reacting a tert-amine selected from the group consisting of trialkylamine, triarylamine, triaralkylamine, mixed alkylaryl, alkylaralkyl, aryl-aralkyl or alkyl-aryl-aralkyl amine, tricycloalkyl amine, dialkyl-cycloalkylamine, diaryl-cycloalkylamine, N-C_{1-30} alkyl piperidine, N,N'-dimethyl piperazine, pyridine, 2-methyl pyridine, N-methylpyrrolidine, N-methylpyrrolidone and N-C_{2-4} alkyl morpholine which is capable of forming an amine oxide with 1–5 moles of aqueous hydrogen peroxide per mole of said tert-amine in the presence of a catalytic amount in the range of from 0.05 to 5.0 weight percent based on the weight of the initial tert-amine of a dialkylcarbonate in which each alkyl group contains up to 12 carbon atoms.

4,889,955

PREPARATION OF (HYDROCARBYLTHIO)AROMATIC AMINES

Paul F. Ranken, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 917,169, Oct. 9, 1986, abandoned, which is a continuation-in-part of Ser. No. 624,532, Jun. 25, 1984, abandoned. This application Nov. 14, 1988, Ser. No. 270,819
Int. Cl.[4] C07C *149/42, 87/64;* C07D *209/36, 233/66*
U.S. Cl. 564—440 12 Claims

1. A process which comprises heating a primary carbocyclic aromatic amine having at least one free ring position and at least one hydrocarbylthio substituent in a ring position other than a position meta to the amino group in the presence of a catalyst to redistribute the hydrocarbylthio groups with little or no co-formation of secondary or tertiary amines.

4,889,956

PREPARATION OF METHOXY PHENYL PHOSPHIDES

Johannes A. Van Doorn, and Nicolaas Meijboom, both of CM Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Mar. 30, 1988, Ser. No. 175,018
Claims priority, application Netherlands, Jun. 22, 1987, 8701449
Int. Cl.[4] C07F *9/28*
U.S. Cl. 568—13 9 Claims

1. The process of producing sodium di(methoxyphenyl)-phosphide wherein each phenyl has a methoxy substituent in at least one of the ring positions ortho or para to the phosphorus, by reacting sodium metal and the corresponding benzyl- or allyl-di(methoxyphenyl)phosphine, in liquid ammonia.

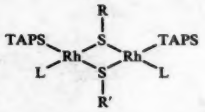
4,889,957

DINUCLEAR AND WATER-SOLUBLE RHODIUM COMPLEXES AND HYDROFORMYLATION CATALYSIS THEREWITH

Bernard Besson, Villeurbanne; Philippe Kalck, Auzeville, and Alain Thorez, Montgiscard, all of France, assignors to Rhone-Poulenc Chimie de Base, Courbevoie, France

Division of Ser. No. 788,202, Oct. 16, 1985, Pat. No. 4,778,905. This application Jun. 29, 1988, Ser. No. 213,149
Claims priority, application France, Oct. 16, 1984, 84 16007
Int. Cl.[4] C07C *45/50*
U.S. Cl. 568—454 3 Claims

1. A hydroformylation catalyst comprising an aqueous solution comprising a dinuclear and water-soluble rhodium complex having the general formula (I):



(I)

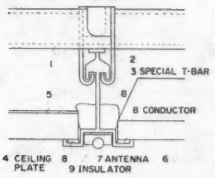
in which R and R', which are identical or different, are each a hydrocarbon radical or a substituted such hydrocarbon radical bearing one or more inert substituents, with the proviso that R and R' may together form a single divalent hydrocarbon radical; TAPS is a sulfonated triarylphosphine ligand; and L is a carbonyl (CO) ligand or a TAPS ligand.

4,889,958

BUILDING WITH ELECTROMAGNETIC SHIELD STRUCTURE FOR INDIVIDUAL FLOORS

Takeshi Takahashi; Masatake Nakamura; Yoshiji Yabana; Toshiuyki Ishikawa, and Koji Nagata, all of Tokyo, Japan, assignors to Shimizu Construction Co., Ltd., Tokyo, Japan

Filed Jun. 10, 1987, Ser. No. 60,297
Int. Cl.[4] H05K *9/00*
U.S. Cl. 174—35 MS **6 Claims**



1. A multi-floor building having an electromagnetic shield structure for individual building floors, characterized in that an electromagnetic shielding material is positioned in the exterior walls of the building, in the windows, doorways and other openings in said building exterior walls, in each floor slab between the floors of said building and in the interior of said building in the stairwells and openings between the individual floors of said building, each said floor slab having a ceiling plate having an overlapping structure with an electromagnetic shielding material at said overlapping structure and an electromagnetic shielding material covering the entirely of the ceiling structure at each floor slab integrally connected to said overlapping structure electromagnetic shielding material.

4,889,959

RFI SHIELDING GASKET

David B. Taylor, Greenacres, Wash., and Steven C. Zemke, Post Falls, Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.

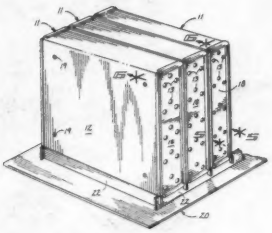
Filed Jul. 15, 1988, Ser. No. 219,515
Int. Cl.[4] H05K *9/00*
U.S. Cl. 174—35 GC **6 Claims**

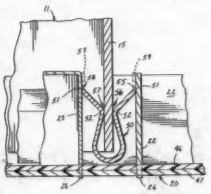
1. An RFI shielding gasket adapted for use within a grounded metal assembly having an open elongated slot of constant cross-section formed by opposed inwardly facing surfaces separated from one another by a selected spacing, wherein the slot is adapted to removably receive an elongated edge of a metal wall having a thickness less than the selected spacing of the slot with the shielding gasket frictionally engaging both the surfaces of the slot and the wall received therein, the shielding gasket comprising:

an elongated strip of spring metal folded along a longitudinal centerline to form a two-sided resilient gasket having a longitudinal bend closing one edge of the gasket;

an open longitudinal throat formed at the remaining edge of the gasket, the open longitudinal throat including a pair of opposed outwardly projecting edges that are parallel to one another and to the one edge of the gasket, the normal maximum transverse width across the outwardly projecting edges of the gasket being greater than the selected spacing between the inner surfaces of the open slot of a grounded metal assembly to be used and

a pair of inwardly-bent pinch lines formed in opposition to one another between and parallel to the two edges of the gasket, the normal transverse spacing between the pinch





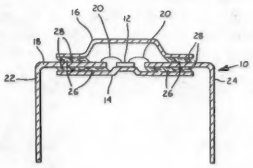
lines at the interior surfaces of the gasket being less than the thickness of the metal wall.

4,889,960

SEALED SEMICONDUCTOR CASING

Sheldon H. Butt, Godfrey, Ill., assignor to Olin Corporation, New Haven, Conn.

Division of Ser. No. 477,552, Mar. 21, 1983, Pat. No. 4,532,222.
This application Feb. 1, 1985, Ser. No. 697,541
Int. Cl.[4] H01L *23/08*
U.S. Cl. 174—52.4 **6 Claims**



1. In a casing adapted to house an electronic component comprising:

a metal base member;

a metal housing member being mounted upon said base member to provide a hollow enclosed casing for receiving said electronic component;

a metal leadframe within said enclosed casing for electrical connection to said electronic component, said leadframe having terminal leads projecting between said base member and said housing member external to said casing, the improvement comprising:

means for sealing and bonding said terminal leads to both said base member and to said housing member whereby a hermetically enclosed casing is formed, said sealing and bonding means comprising;

about 5 to 25% by volume of discrete particles in a glass matrix;

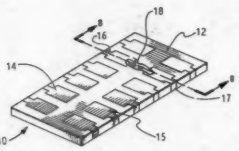
said glass matrix being a tin-phosphorous-oxyfluoride composition having a very low glass transition temperature to prevent serious degradation of said discrete particles.

4,889,961

GRAPHITE TRACE ELECTRICAL INTERCONNECT

Jerrold L. Carlson, Waseca, Minn., assignor to E. F. Johnson Company, Waseca, Minn.

Filed Aug. 10, 1988, Ser. No. 230,564
Int. Cl.[4] H05K *1/00, 3/00*
U.S. Cl. 29—846 **39 Claims**



1. A switch device for providing an electrical interconnection among circuit elements on a printed circuit board, comprising:

a substrate surface on the printed circuit board;

a plurality of electrically conductive contact pads located on the substrate surface;

a plurality of isolation regions defined on the substrate surface such that each of the contact pads is separated from the remaining contact pads by at least one of the isolation regions;

means for electrically connecting each of the contact pads to one or more of the circuit elements on the printed circuit board; and

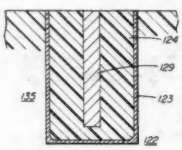
erasable graphite trace means for repeatedly and selectively electrically interconnecting two or more of the contact pads by tracing between the selected contact pads across at least one of said isolation regions after the printed circuit board has been manufactured to provide a consistent and sustainable electrical interconnection of the circuit elements associated with the selected contact pads, such that the erasable graphite trace means may also be repeatedly and selectively removed from between the selected contact pads to disconnect the circuit elements associated with the selected contact pads to allow the circuit elements to be quickly and easily reprogrammed.

4,889,962

CIRCUIT BOARD WITH COAXIAL CIRCUIT AND METHOD THEREFOR

George R. Hagner, Cary, N.C., assignor to Northern Telecom Limited, Montreal, Canada

Filed Aug. 19, 1988, Ser. No. 233,815
Int. Cl.[4] H05K *1/00, 3/00*
U.S. Cl. 174—68.5 **12 Claims**



1. A circuit board having at least one coaxial circuit, said circuit board comprising:

an electrically insulative substrate having at least one generally planar face and carrying at least one groove;

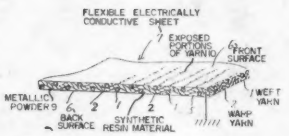
said at least one groove having a plating of conductive material and containing a solid heat curable insulator which has embedded therein an elongated conductor.

4,889,963

FLEXIBLE ELECTRICALLY CONDUCTIVE SHEET

Kozo Onai, Ashikaga, Japan, assignor to Tokyo Sen-I Kogyo Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 150,305, Jan. 29, 1988, abandoned. This application Nov. 14, 1988, Ser. No. 271,410
Claims priority, application Japan, Jan. 29, 1987, 62-012024
Int. Cl.[4] H01B *5/08*
U.S. Cl. 174—129 R **10 Claims**



1. A flexible electrically conductive sheet comprising:

a plurality of yarns, each made of electrically conductive stainless steel fibers and electrically non-conductive fibers, said yarns being woven as warp and weft yarns to form an electrically conductive fabric;

a flexible synthetic resin material impregnated in said fabric; and

said stainless steel fibers having portions exposed on a surface of said synthetic resin material.

4,889,964

ROTATING RETRACTABLE CAM LIMIT SWITCH

Kevin I. Pea, Mayville, Wis.; David M. Tenniswood, Birmingham, Mich., and Steven M. Loeck, Beaver Dam, Wis., assignors to Gleason Reel Corp., Mayville, Wis.

Continuation-in-part of Ser. No. 166,654, Mar. 11, 1988, abandoned. This application May 15, 1989, Ser. No. 352,361
Int. Cl.[4] H01H *19/62, 3/42;* **F16H** *53/00*
U.S. Cl. 200—31 R **34 Claims**

1. A rotating cam limit switch having fixed and rotating elements comprising:

a rotating hub for mounting rotating elements of said switch to a rotating member;

a rotating retractable cam having an exposable cam surface;

rotating adjustable position means mounted to said hub for angularly adjusting the cam position, said position means being partially rotatable with respect to said hub;

rotating adjustable dwell means interfitted with said hub and said cam for varying the exposed length of the cam surface; and

fixed switch means actuated by the cam surface for assuming a first state as the cam surface is contiguous to said switch

means and returning to a second state when the cam surface is not contiguous to said switch means.

4,889,965

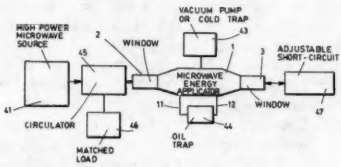
MICROWAVE DRYING OF THE PAPER INSULATION OF HIGH VOLTAGE ELECTROTECHNICAL EQUIPMENTS

Pierre Gervais, Brossard; Michel Duval, Montreal, and Marcel Giroux, Repentigny, all of Canada, assignors to Hydro-Quebec, Montreal, Canada

Filed Dec. 15, 1988, Ser. No. 284,732

Int. Cl.[4] H05B *6/70*

U.S. Cl. 219—10.55 M **18 Claims**



1. A method of drying water-permeable and microwave-permeable dielectric insulation in an electrotechnical equipment including a through, inner and elongated electric conductor wrapped in the said insulation infiltrated with water, comprising the steps of:

mounting the said equipment within a hollow tubular element made of electrically conducting material, with the electric conductor coaxial with the said tubular element to thereby form a coaxial, microwave transmission line;

propagating microwaves through the coaxial transmission line to heat the water infiltrated within the dielectric insulation and transform it into water vapor; and

evacuating the water vapor outside of the said coaxial transmission line;

transformation of the water into water vapor and evacuation of the said vapor outside of the transmission line causing drying of the dielectric insulation.

4,889,966

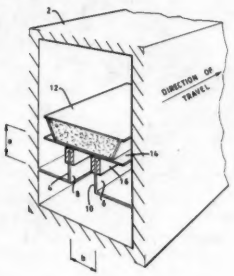
APPARATUS FOR HEATING DISCRETE PACKAGES OF PRODUCTS USING MICROWAVES

Roger J. Meredith, Rutland, England, assignor to APV Magnetronics Limited, Leicester, England

Filed Aug. 5, 1988, Ser. No. 228,575

Int. Cl.[4] H05B *6/74*

U.S. Cl. 219—10.55 F **8 Claims**



1. A microwave apparatus for heating a discrete package of a product comprising a microwave field generator for generating a microwave field of energy, an elongate waveguide being connected to said generator, means being attached to said waveguide for supporting and axially moving the package through the waveguide, means beng attached to said waveguide for deflecting and concentrating the microwave field, said waveguide being arranged to propogate microwave energy from said generator such that the electronic field of the microwave energy is substantially transverse to the direction of propogation, and said deflecting and concentrating means being arranged to produce a raised value o energy within the interior of the package and ensure uniform heating thereof.

4,889,967

PLURAL WELDING ROD WELDING APPARATUS

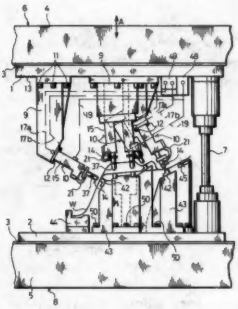
Hajime Iida, and Tadashi Nakamura, both of Shiga, Japan, assignors to Takao Kinzoku Kogyo Co., Ltd., Shiga, Japan

Filed Aug. 17, 1988, Ser. No. 233,105

Claims priority, application Japan, Dec. 3, 1987, 62-185290[U]

Int. Cl.[4] B23K *11/10*

U.S. Cl. 219—87 **8 Claims**



1. A welding equipment having a plurality of fixed electrodes and a plurality of movable electrode rod units opposing said fixed electrodes characterized in that each electrode rod unit of said plurality of movable electrode rod units is composed of a single electrode rod reciprocally inserted for reciprocal movement in a cylindrical block with said electrode rod and said cylindrical block in each said electrode rod unit linked with a conductive cable and said plurality of electrode rod units being individually removably mounted on an electrode plate through adaptors, first fluid pressure piping connected to each said cylindrical block for fluid for both cooling said electrode rod unit in said cylindrical block and the tip thereof and for pushing out said electrode rod from said cylindrical block and a second fluid pressure piping connected to each said cylindrical block for retracting said electrode rod into said cylindrical block, said first and second fluid pressure pipings being removably joined to each said electrode rod unit.

4,889,968

LASER-PUNCH COMPOSITE PROCESSING MACHINE

Hidetoshi Miyama, Atsugi; Masanori Sugimoto, Isehara, and Kouji Kawaguchi, Yokohama, all of Japan, assignors to Amada Company, Limited, Japan

Filed Apr. 29, 1988, Ser. No. 187,728

Claims priority, application Japan, Apr. 30, 1987, 62-064128; May 1, 1987, 62-065308; May 6, 1987, 62-108855

Int. Cl.[4] B23K *26/00*

U.S. Cl. 219—121.7 **25 Claims**

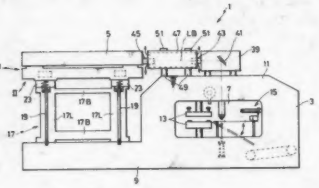
1. A laser-punch composite processing machine comprising:

a main frame;

a worktable mounted on the main frame for supporting a workpiece;

a punch tool and a die tool mounted on the main frame for punching the workpiece positioned therebetween, in corporation with each other;

a vertically reciprocatable punch ram mounted on the main frame for striking the punch tool and causing the punch tool to perform the punching operation;



a laser processing head mounted on the main frame for emitting a laser beam to perform a laser processing on the workpiece;

a vibration-proofing frame mounted on the main frame with a preload to enhance the vibration property thereof;

a laser beam generator mounted on the vibration-proofing frame through vibration proofing means; and

an optical beam pathway for guiding the laser beam output from the laser generator to the laser processing head.

4,889,969

REDUCED-SPATTER PULSE ARC WELDING MACHINE FOR USE WITH A CONSUMABLE ELECTRODE

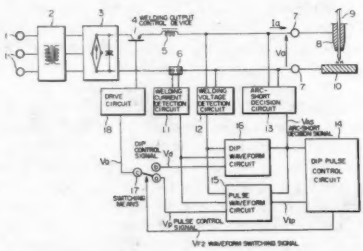
Naoki Kawai, Ikeda; Kouji Hamamoto, and Tomiaki Hosokawa, both of Takarazuka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 25, 1988, Ser. No. 185,459

Claims priority, application Japan, Apr. 28, 1987, 62-105146; May 21, 1987, 62-124205

Int. Cl.[4] B23K *9/09*

U.S. Cl. 219—130.51 **8 Claims**



1. A pulse arc welding machine for use with a consumable electrode to weld a base metal, comprising:

judging means for judging whether the electrode is shorted with the base metal or whether the electrode is separated from the base metal to generate an arc therebetween, and for producing an arc-short decision signal;

dip-pulse control means responsive to the arc-short decision signal for generating a pulse synchronizing signal and for generating a waveform switching signal having first and second digital states, the waveform switching signal changing from the first digital state to the second digital state if short circuit between the electrode and the base metal has lasted longer than a predetermined first period of time, the waveform switching signal remaining in the second digital state until an arc is restored and for a predetermined second period of time thereafter;

pulse waveform means responsive to the pulse synchronizing signal for generating a pulse control signal which is used for operating the welding machine in a pulse arc welding mode in which the welding current has a sequence of base-pulse periods and a current pulse and a base current alternate in each base-pulse period, with the pulse control signal determining the timings of the current pulse and the base current in each base-pulse period, the welding being accomplished by a spray of material from the electrode in the pulse arc welding mode;

dip waveform means responsive to the arc-short decision signal for generating a dip control signal when the arc-short decision signal indicates that the electrode is shorted to the base metal, the dip control signal being used for operating the welding machine in a shorting transfer mode in which the welding current is controlled to follow a first waveform in which the welding current rises at a rate not greater than the rising rate of the current pulse until an arc is reproduced between the electrode and the base metal, and to thereafter follow a second waveform during the second period of time, the second waveform being different from both the current pulse and the base current;

welding output control means for controlling the welding current; and

switching means for conveying the pulse control signal to the welding output control means when the waveform switching signal is in the first digital state and for conveying the dip control signal to the welding output control means when the waveform switching signal is in the second digital state.

4,889,970

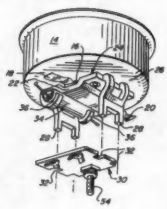
FACIAL SAUNA

Elmer L. Hoffmann, Wheaton, Ill., assignor to Schwalm Electronics Inc., Highland Park, Ill.

Filed Nov. 28, 1988, Ser. No. 276,783

Int. Cl.[4] H05B *1/02*

U.S. Cl. 219—271 **17 Claims**



1. In a liquid heater comprising a conductive metal heating bowl, and electrical means for heating said bowl including a heating element and a terminal board as part of circuit means for control of said heating element, the improvement comprising, in combination:

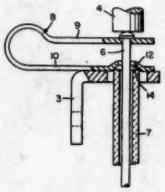
an integral, one-piece bracket attached to the underside of said bowl, said bracket defining a plurality of arms having free ends extending outwardly from said bowl, said terminal board being carried by said arms in spaced relation from said bowl, said bracket and bowl also defining a tunnel positioned against the underside of said bowl, said heating element occupying said tunnel.

4,889,971

APPARATUS FOR REGULATION OR LIMITATION OF TEMPERATURE

Helmut Bayer, Vienna, Austria, assignor to Electrovac Fabrikation Electrotechnisher Spezialartkel Gesellschaft mbH, Vienna, Austria

Filed May 31, 1988, Ser. No. 200,278
Claims priority, application Austria, Jun. 5, 1987, 1443/87
Int. Cl.[4] H05B *1/02;* H01H *37/48*
U.S. Cl. 219—449 16 Claims



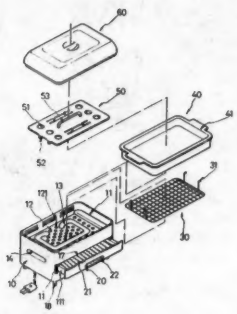
1. A device for regulating or limiting at least one temperature value or one temperature range of radiant-heating or contact-heating bodies of electrical cooking appliances in conjunction with hobs consisting of metal, glass-ceramic or the like, said device comprising: contact means for regulating the temperature of a heating body; at least one temperature sensor positioned between the heating body and a hob and having a bar of high thermal expansion material, one end of the bar being connected to the contact means; a tube of low thermal expansion material within which the bar is positioned; concave receptacle means for contacting and supporting one end of the tube located on one side of the contact means, the receptacle means having a surface arched in the direction of the contact means and having centrally a perforation for permitting the bar to pass therethrough, wherein the arched surface of the concave receptacle means is in direct contact with an end of the tube.

4,889,972

MULTI-FUNCTIONAL ELECTRICALLY ACTIVATED STOVE

Chia C. Chang, No. 169, Sec. 2, Ho Tso Rd., Tu Tso Li, Ho Met, Chen. Chang Hua Hsien, Taiwan

Filed Aug. 11, 1988, Ser. No. 231,352
Int. Cl.[4] A47J *27/00;* H05B *3/42*
U.S. Cl. 219—472 1 Claim



1. A multi-functional electrically activated stove comprising:

a stove housing having a heat conducting planar member defining an upper housing chamber and a lower housing chamber, said heat conducting planar member having an electrically conducting tube member positioned adjacent an upper surface thereof,

a lower grill member insertable into said lower housing chamber through an opening formed in said stove housing below said heat conducting planar member, said lower grill member having a plurality of web members for positioning foodstuffs thereon;

an upper baking member defining a mesh screen framework having a plurality of hook members extending therefrom for releasable coupling to a boundary edge of a wall of said upper housing chamber, said upper baking member being mounted above said electrically conducting tube member;

a pan member insertable within said upper housing chamber;

a steam plate member having openings formed therethrough, said steam plate member having a plurality of downwardly depending legs for interfacing and locating said steam plate member on said pan member, said steam plate member having a handle member secured to an upper surface thereof; and,

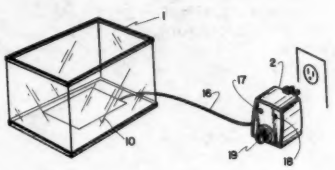
a cover member removable from said stove housing for defining a closed housing, said cover member being formed of a substantially transparent plastic composition.

4,889,973

AQUARIUM HEATER

Michael F. Farinacci, 4680 Willoughcroft, Willoughby, Ohio 44094, and William A. Rowell, 238 Woodie Brook Rd., Chardon, Ohio 44024

Filed Oct. 12, 1988, Ser. No. 256,604
Int. Cl.[4] H05B *3/20*
U.S. Cl. 219—528 4 Claims



1. An aquarium heater for mounting on the outside bottom surface of an aquarium tank or the like comprising;

(a) a heating pad wherein said heating pad comprises an etched-foil heating element laminated between layers of insulating material, said etched-foil heating element being arranged to provide a clear space within said heating pad;

(b) a thermistor for sensing the temperature of said heating pad wherein said thermistor is located within said clear space; and

(c) an electronic circuit for controlling the temperature in said heating pad wherein said circuit operates to limit the current in the thermistor below the point at which self-heating occurs.

4,889,974

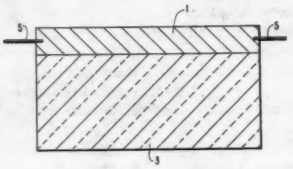
THIN-FILM HEATING ELEMENT

Hans Auding; Günter Frank; Heiner Köstlin, and Bruno Vitt, all of Aachen, Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 22, 1988, Ser. No. 158,522
Claims priority, application Fed. Rep. of Germany, Feb. 21, 1987, 3705639
Int. Cl.[4] H05B *3/16*
U.S. Cl. 219—543 10 Claims

1. A thin-film heating element comprising a temperature-sta-

ble, electrically insulating substrate having a thin, electrically conductive metal oxide film which is doped with foreign atoms which compensate each other in pairs and each of which pairs consist of at least one acceptor-forming element and one donor-forming element, the metal oxide film being provided with



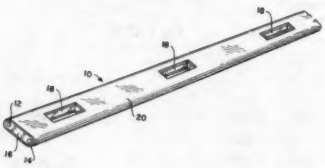
connecting electrodes, characterized in that the metal oxide film is doped with maximally 10 at % of each of the foreign atoms compensating each other in pairs, the quantity of said acceptor-forming elements and said donor-forming elements differs maximally by 10%.

4,889,975

SELF-REGULATING HEATER HAVING A HEAT TAPE THAT STOPS TRACKING

Richard W. Farkas, Stow; David A. Rock, Ravenna, and James H. Anderson, Massillon, all of Ohio, assignors to The Fluorocarbon Company, Aurora, Ohio

Filed Mar. 16, 1988, Ser. No. 168,650
Int. Cl.[4] H05B *3/10*
U.S. Cl. 219—548 **12 Claims**



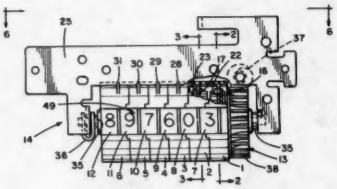
1. A self-regulating heater, comprising:
a pair of spaced electrical conductors;
a compound surrounding said conductors and forming a web between said conductors, said compound having the characteristic that it will conduct electrical current between said conductors at low temperatures with electrical resistance at a level such that said conductors and said compound form a useful electrical heater, said compound further having the characteristic that its electrical resistance increases at higher temperatures such that the heat output from said heater is reduced whereby said heater is self-regulating, said compound being combustible and subject to so-called "wet fires" when arcing occurs between said conductors over the surface of said web such as when moisture or other electrolyte accumulates on the ends of said conductors or at an area where said compound is worn away from said conductors, said web having spaced discontinuities formed therein that stop such "wet fires" if they should occur.

4,889,976

TAMPER-PROOF ODOMETER

Thomas P. Powell, 533 S. Sierra #140, Solana Beach, Calif. 92075

Filed Jul. 3, 1986, Ser. No. 881,943
The portion of the term of this patent subsequent to Feb. 26, 2006, has been disclaimed.
Int. Cl.[4] G01C *22/00*
U.S. Cl. 235—96 **8 Claims**



1. In a tamper-proof odometer having an odometer register including a plurality of sequentially driven odometer dials carried on a common shaft with a pinion gear supported on an individual bracket disposed between each adjacent pair of dials to engage gears formed as part of each dial on an adjacent pair, the improvement comprising a shield supported on each of the brackets with all shields interlocked one to the other to form collectively a partial barrier cover over the odometer register dials exposing only the register readout numbers.

4,889,977

METHOD OF IDENTIFYING THE DISPOSITION OF PLUG-IN UNITS AT A WAREHOUSE

Robert Haydon, Little Rock, Ark., assignor to Southwestern Bell Telephone Company, Little Rock, Ark.

Filed Dec. 21, 1987, Ser. No. 135,719
Int. Cl.[4] G06F *15/20, 15/24*
U.S. Cl. 235—375 **2 Claims**

1. A method of identifying the disposition of portable modular plug-in units of telecommunications equipment, the method comprising the steps of:
placing a bar code on each plug-in unit identifying that unit;
installing said plug-in units in telecommunications equipment;
removing at least some of the plug-in units from the telecommunications equipment and transporting the removed plug-in units to a warehouse or the like;
storing data in a scanner to identify which of the removed plug-in units are to be scrapped, which are to be modified, which are to be tested, and which require no action;
at said warehouse or the like, scanning the bar code of each

of said removed plug-in units with a scanning wand attached to the scanner to identify that unit; and

comparing said stored data with the identity of each removed plug-in unit as read by the scanner to determine what action to take regarding the removed plug-in unit.

4,889,978

CASH DISPENSER WITH MANIFOLD SAFE

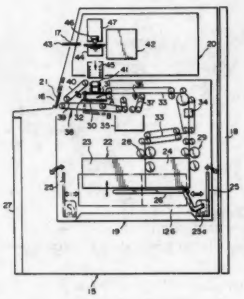
Yoshinori Koshida; Isao Miyake; Yasuo Okazaki; Nobuhiro Motoi, and Mitsuru Nakaya, all of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Oct. 11, 1988, Ser. No. 255,270

Claims priority, application Japan, Oct. 8, 1987, 62-252475; Oct. 8, 1987, 62-252476; Oct. 8, 1987, 62-252477; Oct. 8, 1987, 62-252474; Jun. 13, 1988, 63-143643; Aug. 9, 1988, 63-197053

Int. Cl.[4] G06F *15/30*

U.S. Cl. 235—379 **16 Claims**



1. In a cash dispenser for dispensing bills in response to a customer's operation, said cash dispenser comprising a bill outlet for presenting bills to a customer, safe means removably mounted in said cash dispenser and loaded with bills to be dispensed, and feeding and transporting means for feeding bills from said safe means and transporting the bills to said bill outlet, the improvement wherein:

said safe means comprises a single casing in which a plurality of storing sections are defined, said storing sections being disposed at substantially the same level as each other and storing bills individually; and

said feed and transporting means comprises a plurality of feeding means each being associated with a respective one of said storing sections for feeding the bills one by one from said storing sections associated therewith, and transport path means for transporting the bills fed by said feeding means to said bill outlet.

4,889,979

METHOD FOR EXTENDING LIFE OF OPTICALLY RECORDED INFORMATION

Jerome Drexler, Los Altos Hills, and Eric W. Bouldin, Atherton, both of Calif., assignors to Drexler Technology Corporation, Mountain View, Calif.

Filed Aug. 15, 1986, Ser. No. 896,991

Int. Cl.[4] G06K *5/00;* **G11B** *23/50, 7/28*

U.S. Cl. 235—454 **5 Claims**

1. A method for extending the life of optically recorded information comprising,

recording information on a non-delete optical information storage medium by creating information data spots with a light beam,

in an index positioned on the medium, indexing the information recorded by creating index data spots with the light beam,

determining periodically the quality of one of the index data spots and the information data spots to determine the deterioration of the data spots from a comparison of change in an optical property of the data spots relative to the optical property of the unrecorded medium,

duplicating the information data spots that have deteriorated, by re-recording the previously recorded information on the medium, the timing of the duplication being a function of the deterioration of the data spots, and

indexing the re-recorded information on the medium.

4,889,980

ELECTRONIC MEMORY CARD AND METHOD OF MANUFACTURING SAME

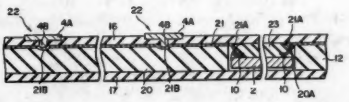
Kazuya Hara, and Kenji Rikuna, both of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Division of Ser. No. 881,221, Jul. 2, 1986, Pat. No. 4,795,895. This application Mar. 1, 1988, Ser. No. 162,519

Claims priority, application Japan, Jul. 10, 1985, 60-151779

Int. Cl.[4] G06K *19/02*

U.S. Cl. 235—488 **20 Claims**



1. A method for manufacturing a sheet-like laminated structure having a plurality of external contact terminals, comprising the steps of:

providing carrier means for carrying a plurality of conductive leads thereon;

providing insulating means on said carrier means, for covering at least said plurality of conductive leads; and

urging external contact terminals by means of an external force to cause said external contact terminals to be inserted in said insulating means and to pass through said insulating means, and to contact said conductive leads.

4,889,981

MANUALLY ACTUABLE, MACHINE READABLE MENU CARD WITH RIB CONTROLLED BUBBLES

H. C. Harbers, Jr., Templeton, Calif., assignor to Escorp, Inc., San Luis Obispo, Calif.

Continuation-in-part of Ser. No. 149,492, Jan. 28, 1988, Pat. No. 4,812,630, which is a continuation-in-part of Ser. No. 916,942, Oct. 8, 1986, Pat. No. 4,808,805. This application Nov. 14, 1988, Ser. No. 270,827

Int. Cl.[4] G06K *19/06*

U.S. Cl. 235—490 **28 Claims**

1. A menu device, comprising

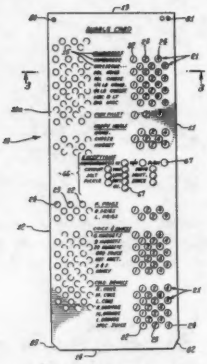
(a) a card,

(b) indicia on the card listing items to be selected,

(c) bubbles on the card and in special correspondence with said indicia, the bubbles having positions on the card representative of items to be selected,

(d) the bubbles having first positions projecting in one direction outwardly from the plane of the card, and second positions into which they are displaced relative to the

plane of the card, by finger pressure, to indicate selection of items corresponding to bubble positions on the card,



(e) and said bubbles having integral local ribbing acting to stiffen the displaced bubbles for resisting return thereof to said first positions.

4,889,982

ENCODED LABEL HAVING REDUNDANT AND SCRAMBLED INDICIA FOR IDENTIFYING A MAGNETIC TAPE CARTRIDGE

James R. Young, Westminster, and Michael Moy, Lafayette, both of Colo., assignors to Storage Technology Corporation, Louisville, Colo.

Filed Aug. 19, 1987, Ser. No. 87,085

Int. Cl.[4] G06K *19/06, 19/08*

U.S. Cl. 235—494 **27 Claims**

1. An encoded label for a magnetic tape cartridge, comprising:

a substrate including an obverse side having pre-printed hereon at least two parallel redundant means for identifying said cartridge;

a first plurality of n characters contained in n contiguous character locations within a first one of said identifying means, said first plurality of characters defining a first character sequence expressive of a first indicator for identifying said cartridge; and

a second plurality of n characters each of which corresponds to a different associated character in said first plurality of characters and each of which is contained in n contiguous character locations within a second one of said identifying means, said second plurality of characters defining a second character sequence expressive of a second indicator for identifying said cartridge with said second indicator being redundant to said first indicator;

wherein said characters of said second sequence are scrambled with respect to said characters of said first sequence so that each character of said second sequence in said second identifying means is neither laterally adjacent its corresponding character in said first sequence in said first identifying means nor is contiguous to a character of said second sequence in said second identifying means that is adjacent to said corresponding character in said first sequence in said first identifying means.

4,889,983

IMAGE SENSOR AND PRODUCTION METHOD THEREOF

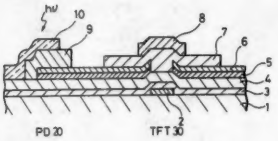
Yoshinori Numano, and Masahiro Hayama, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Nov. 22, 1988, Ser. No. 275,101

Claims priority, application Japan, Nov. 24, 1987, 62-295852; Mar. 4, 1988, 63-52222

Int. Cl.[4] H01J *40/14*

U.S. Cl. 250—211 J **33 Claims**



1. An image sensor comprising:

an amorphous silicon photodiode disposed on an insulating substrate;

an amorphous silicon thin film transistor disposed on said insulating substrate for reading out charges stored by said photodiode; and

a wiring film forming both a source/drain electrode of said transistor and a first electrode of said photodiode free of steps.

4,889,984

RADIATION DETECTOR ARRAYS HAVING REDUCED NUMBER OF SIGNAL PATHS

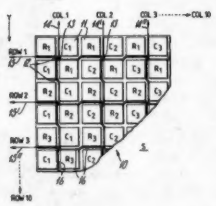
Melvyn D. Sedgbeer, Bracknell, United Kingdom, assignor to British Aerospace Pubic Limited Company, London, England

Continuation-in-part of Ser. No. 926,881, Nov. 6, 1986, abandoned, which is a continuation of Ser. No. 721,668, Apr. 10, 1985, abandoned. This application Oct. 21, 1987, Ser. No. 111,120

Claims priority, application United Kingdom, Apr. 14, 1984, 8409760

Int. Cl.[4] H01J *40/14*

U.S. Cl. 250—211 R **7 Claims**



1. A radiation detector for indicating the position of an image incident thereon, comprising:

a matrix of radiation sensitive detector elements formed on a substrate;

interconnection means electrically interconnecting selected elements of the array to form a plurality of electrically discrete groups each having respective signal output means, said group being arranged in two series;

each series of groups extending non-rectilinearly and generally transversely relative to one another; and

said series being disposed such that on incidence of an image on said detector, each series of groups generates an output indicative of a respective coordinate of the image with respect to the detector, whereby the position of the image may be determined.

4,889,985

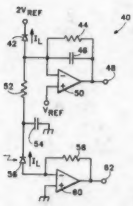
COMBINED OPTICAL POWER METER AND RECEIVER

Bryan E. Allsop, Hertfordshire; Allen W. Mabbitt, Bedford, both of England, and Kevin K. Smith, West Linn, Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 26, 1988, Ser. No. 262,759

Int. Cl.[4] H01J *40/14*

U.S. Cl. 250—214 A **4 Claims**



1. A combined optical power meter and receiver comprising:

(a) a first slow transimpedance amplifier having a current input referenced to a first reference voltage, and a voltage output;

(b) a second fast transimpedance amplifier having a current input referenced to a second reference voltage, and a voltage output;

(c) a first photodiode having an anode and a cathode coupled between the current input of said first slow transimpedance amplifier and the current input of said slow transimpedance amplifier, the voltage output of the first slow transimpedance amplifier representing the average input optical power dissipated by the first photodiode and the voltage output of the second fast transimpedance amplifier simultaneously representing the instantaneous current flowing through the first photodiode.

4,889,986

SERIAL INTERFEROMETRIC FIBER-OPTIC SENSOR ARRAY

Alan D. Kersey, Springfield, and Anthony Dandridge, Alexandria, both of Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 18, 1988, Ser. No. 233,521

Int. Cl.[4] G01B *9/02*

U.S. Cl. 250—227 **16 Claims**

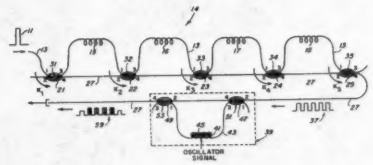
1. A serial fiber-optic sensor array comprising:

an input fiber formed into a series of N sensor elements at separated locations along said input fiber, each of said sensor elements being of optical path length L and being responsive to any change in an associated predetermined physical parameter for changing its optical path length;

a light source for selectively transmitting a light pulse into said input fiber;

an output fiber;

N+1 optical couplers for coupling said series of N sensor elements to said output fiber to enable a predetermined portion of said light pulse at each said location before the first said sensor element, between adjacent ones of said sensor elements and after the Nth said sensor element to be coupled out of said input fiber to said output fiber at said separated locations in order to produce at the output of said Nth sensor element a series of N+1 pulses separated in the time domain; and



output means of optical path length L being responsive to said N+1 pulses for coherently mixing pulses obtained from each pair of consecutive said locations to obtain a series of N interferometric signals respectively indicative of any changes in the physical parameters to which said sensor elements are respectively responsive.

4,889,987

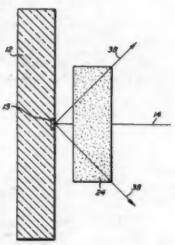
PHOTO ION SPECTROMETER

Dieter M. Gruen, Downers Grove; Charles E. Young, Westmont, and Michael J. Pellin, Naperville, all of Ill., assignors to ARCH Development Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 870,437, Jun. 4, 1986. This application Feb. 13, 1987, Ser. No. 14,332

Int. Cl.[4] H01J *49/40*

U.S. Cl. 250—282 **11 Claims**



1. A method for quantitative spectroscopic analysis of a sample using a spectrometer to measure the quantity of a selected atomic component removed from said sample by laser beam bombardment, comprising the steps of:

bombarding for a preselected short time period less than about twenty picoseconds said sample with said laser beam and generating a volume near said sample containing said selected atomic component, said short time period calculated to substantially avoid further excitation by said laser beam of said selected atomic component generated in said volume;

applying at least one radiation beam pulse to said atomic component volume for achieving ionization of said selected atomic component;

extracting said ionized selected atomic component from said volume near said sample; and

detecting said extracted selected atomic component to determine the relative quantity of said selected atomic component in said sample.

4,889,988

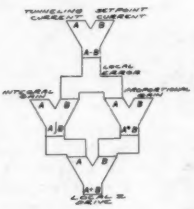
FEEDBACK CONTROL FOR SCANNING TUNNEL MICROSCOPES

Virgil B. Elings, and John A. Gurley, both of Santa Barbara, Calif., assignors to Digital Instruments, Inc., Santa Barbara, Calif.

Filed Jul. 6, 1988, Ser. No. 215,729

Int. Cl.[4] H01J *37/26*

U.S. Cl. 250—306 **43 Claims**



1. A feedback loop system to control a relative vertical position of a tip to a surface of a sample and with the tip or sample scanned in a horizontal plane relative to the surface to measure the topography of the surface, including

first means coupled to the tip or sample for providing relative scanning of the tip across the surface in a horizontal plane along a plurality of adjacent scanning lines,

second means coupled to the tip and the surface for producing output signals in accordance with the relative vertical position between the tip and the surface at individual positions along the plurality of adjacent scanning lines,

the third means responsive to the output signals from the second the vertical position of the tip or sample at individual positions,

fourth means coupled to one or both of the second and third means, for storing signals from these means at individual locations for later retrieval of these stored signals and with the third means responsive to the output signals from the second means and the previously stored signals from the fourth means for producing control signals representing the vertical position of the tip or sample at individual position, and

fifth means coupled to the tip or sample and the third means and responsive to the control signals to control the tip or sample in accordance with the control signals to a predetermined vertical position.

4,889,989

CASSETTE FOR IMAGE INFORMATION RECORDING CARRIER, MECHANISM FOR REMOVING IMAGE INFORMATION RECORDING CARRIER FROM THE CASSETTE, AND APPARATUS FOR READING IMAGE INFORMATION

Ryoichi Yoshimura; Shumpeita Torii, and Naoto Yamada, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 17, 1986, Ser. No. 920,331

Claims priority, application Japan, Oct. 17, 1985, 60-232031; Oct. 19, 1985, 60-234183; Oct. 19, 1985, 60-234185; Oct. 19, 1985, 60-160165[U]

Int. Cl.[4] G01N *23/04*

U.S. Cl. 250—327.2 **14 Claims**

1. A cassette for storing an image recording carrier, comprising:

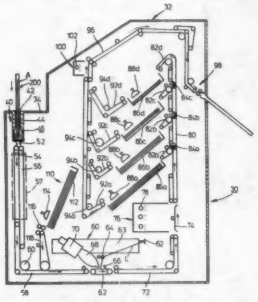
a casing for holding the image recording carrier therein under light-shielding conditions;

a least one lid member mounted on one end of said casing; and means for holding said at least one lid member so as to close said casing and maintain said light shielding conditions, wherein said casing comprises a pair of confronting side walls defining an opening therebetween, said at least one lid member including first and second lid members pivotally mounted on said side walls, respectively, for opening movement away from each other, said holding means comprising means for holding said first and second lid members in contact with each other to keep the image recording carrier in said casing under the light-shielding conditions, such that, under said force applied against said holding means, said first and second lid members are separated from each other and the image recording carrier falls out of said casing through said opening.

12. An apparatus for reading an image from a stimulable phospbor sheet, comprising:

an image readout unit for reading radiation image information recorded on the stimulable phosphor sheet;

an erase unit for erasing a remaining radiation image on the stimulable phosphor sheet after the radiation image information has been read therefrom;



a cassette holder for detachably holding a cassette with said stimulable phosphor sheet stored therein, said cassette having an openable and closable end and means for retaining said cassette in a normally closed state, said stimulable phosphor sheet falling by gravity from said cassette when said end of the cassette is opened;

means for providing a force against said retaining means, to open said cassette; and

sheet conveyor means for receiving the stimulable phosphor sheet that has fallen from said cassette and delivering the stimulable phosphor sheet to said image readout unit and said erase unit, said cassette holder being disposed above said sheet conveyor means so that said cassette releases said stimulable phosphor sheet in a vertical orientation, and said sheet conveyor means receives said stimulable phosphor sheet in said vertical orientation.

4,889,990

METHOD AND APPARATUS FOR RECORDING AND REPRODUCING ELECTRON MICROSCOPE IMAGE

Yuichi Hosoi, and Junji Miyahara, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Continuation of Ser. No. 754,996, Jul. 15, 1985, abandoned. This application Sep. 28, 1988, Ser. No. 251,982

Claims priority, application Japan, Jul. 19, 1984, 59-150175

The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.

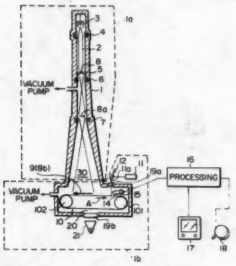
Int. Cl.[4] H01J *37/244*; G03B *42/08*

U.S. Cl. 250—327.2 **5 Claims**

1. A method of recording and reproducing an electron microscope image, which comprises the steps of:

(i) exposing a two-dimensional sensor for storing electron beam energy to an electron beam passing through a sample in a vacuum to have the electron beam energy stored in said two-dimensional sensor, said two-dimensional sensor being a stimulable phosphor sheet where the sensi-

tivity of the stimulable phosphor sheet to said electron beam is greater than that of a photographic film such that a lower amount of the electron beam can be used to minimize damage to the sample,



(ii) exposing said two-dimensional sensor to light in said vacuum to release the stored energy as light emission, and

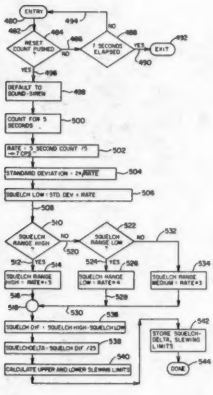
(iii) photoelectrically detecting the emitted light.

4,889,991

GAMMA RADIATION DETECTOR WITH ENHANCED SIGNAL TREATMENT

Raymond C. Ramsey, and Marlin O. Thurston, both of Columbus, Ohio, assignors to Neoprobe Corporation, Columbus, Ohio

Filed Sep. 23, 1988, Ser. No. 248,816
Int. Cl.[4] G01T *1/161*
U.S. Cl. 250—336.1 **24 Claims**


ENTRY
RESET COUNT PUSHED
1 SECOND ELAPSED
EXIT
DEFAULT TO SOUND-SIREN
COUNT FOR 5 SECONDS
RATE = 5 SECOND COUNT /5
STANDARD DEVIATION = √RATE
SQUELCH LOW = STD. DEV. × RATE
SQUELCH RANGE HIGH
SQUELCH RANGE LOW
SQUELCH RANGE HIGH = RATE×1.5
SQUELCH RANGE LOW = RATE×.4
SQUELCH RANGE MEDIUM = RATE×3
SQUELCH DIF = SQUELCH HIGH-SQUELCH LOW
SQUELCH DELTA = SQUELCH DIF /25
CALCULATE UPPER AND LOWER SLEWING LIMITS
STORE SQUELCH-DELTA, SLEWING LIMITS
DONE

1. A system for detecting and locating sources of gamma radiation within a region of interest, comprising:

a probe movable from position to position within said region of interest including:

a housing having a forward portion extending to a radiation window positionable in the vicinity of a said source;

detector means within said housing for deriving induced charges in response to gamma ray interaction therewith and providing corresponding output signals;

transmission means for transmitting said output signals; and

signal treatment means including:

energy level network means for validating said output signals and deriving count signals in response thereto;

control means responsive to said count signals for entering them into a continuously fed queue from earliest to latest received representing a given period of continuous sampling time, said control means effecting a select weighting of predetermined time defined increments of count signals within said queue and generating from said weighted count signals a stabilized count rate value; and

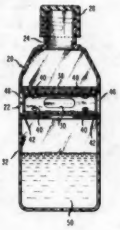
perceptible indicator means for providing a perceptible output corresponding with said stabilized count rate value.

4,889,992

AUTOMATIC INFRARED MICROORGANISM DETECTION INSTRUMENT

Max Hoberman, P.O. Box 7628, Jerusalem, Israel 91076

Filed Nov. 12, 1987, Ser. No. 119,544
Int. Cl.[4] G01N *21/03*
U.S. Cl. 250—343 **38 Claims**



1. An instrument adapted and providing for the measurement of a change in concentration of gas or gases produced in a closed vial or vessel, this measurement utilizing infrared energy for said measurement, this instrument including:

(a) a vial adapted to receive and retain a culture fluid without leakage of fluid;

(b) a resilient cap means disposed at an upper end of the vial and adapted for penetration by a hollow needle and the like for adding at least one component to the closed vial;

(c) a core module providing means for passing therethrough of infrared energy from a source to a detector, this core module providing sealing exclusion of the interior of the vial to atmosphere, said core module including:

(a 1) a plurality of passageway means from the interior of said vial to and through said passageway;

(a 2) a sized receiving bore formed in said core module and therethrough;

(a 3) positioning said core module in the vial so as to be positioned in a determined relationship to a bottom portion of the vial;

(d) a baffle insert mounted in the bore of said core module, said baffle insert in a mounted condition having means for excluding exterior air and the like from entering that bore portion occupied by said baffle insert, said baffle insert including:

(b 1) a tubular insert having enlarged end portions adapted to fit within said bore of the core module, and with the intermediate portion formed with a reduced tubular portion providing a space between the outer portion of the insert and the bore of the core module;

(b 2) a plurality of hole-like passageways through the walls of said tubular insert, these passageways adapted to provide flow means for gases from the interior of the vial through the passageways in the core module, thence through the hole-like passageways in the baffle insert into the inner portion of the baffle insert, these hole-like passageways in the reduced tubular portion; and

(b 3) window means attached to each end of the tubular insert, these windows adapted to pass infrared energy specific to gases produced in the vial;

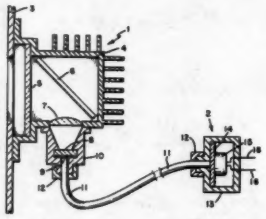
(e) a liquid of specific volume and composition, which volume, when placed in the vial, is below the core module when the vial is arrayed for and in use;
(f) means for adding at least one other material to the liquid in the vial and, with this addition, generating a gas which flows to the exterior of the baffle insert;
(g) said detector arrayed so as to receive said infrared energy from said source and converting said received energy to electrical signals and sending said electrical signals to
(h) a means for measuring the magnitude of said electrical signals and interpreting the magnitude of said electrical signals as a concentration of gas as produced within the vial.

4,889,993

SOLID-STATE OPTICAL FLAME DETECTOR

Janpu Hou; Bruce H. Chai, both of Bridgewater; David D. Badding, Plainfield; Gary A. West, Dover, all of N.J., and Stephen L. Marcus, Tucson, Ariz., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Jun. 23, 1988, Ser. No. 210,542
Int. Cl.[4] G01T *1/20*; G01J *1/42*
U.S. Cl. 250—365 **12 Claims**



1. A device for sensing the presence of a flame burning hydrocarbon fuel comprising, in combination:
(a) a phosphor sensitive to irradiation by ultraviolet radiation in the 0.20 to 0.35 μm band, and capable of emitting visible radiation when subjected to irradiation in said 0.20 to 0.35 μm band;
(b) filter means associated with said phosphor and located between the flame and said phosphor for selective passage of radiation of wavelength below 0.7 μm.
(c) sensing means associated with said phosphor for detecting the visible radiation emitted by said phosphor responsive to irradiation in said 0.20 to 0.35 μm band.

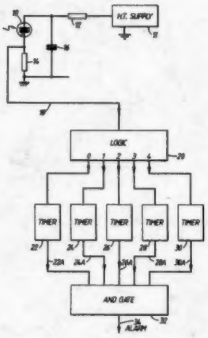
4,889,994

DETECTION OF ELECTROMAGNETIC RADIATION

Alfred R. Brown, Stanwell, and Andrew D. Mackrell, Colnbrook, both of England, assignors to Graviner Limited, Essex, England

Filed Jan. 7, 1988, Ser. No. 142,454
Claims priority, application United Kingdom, Jan. 7, 1987, 8700232
Int. Cl.[4] H01J *47/02*
U.S. Cl. 250—374 **8 Claims**

1. A method of detecting incident radiation using detecting means for that radiation whose response to it is at least in part random but with a predictable probability, comprising the steps of
reacting to each response of the detecting means by defining a respective time period starting at the instant of that response whether or not any preceding said time period has ended, all the said time periods being equal in length, and



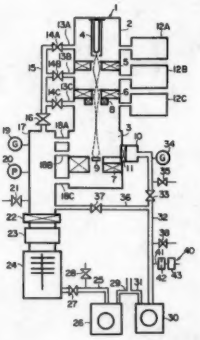
producing an output indication, indicating detection of the said radiation, as soon as a predetermined plurality of said time periods are detected as running simultaneously.

4,889,995

APPARATUS FOR ANALYSIS EMPLOYING ELECTRON

Yoshitsugu Tsutsumi, Ibaraki; Shinjiro Ueda, Abiko, and Tadashi Otaka, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 20, 1988, Ser. No. 286,848
Claims priority, application Japan, Dec. 23, 1987, 62-324009
Int. Cl.[4] H01J *37/18*
U.S. Cl. 250—441.1 **11 Claims**



1. An analysis system for analyzing a specimen with electrons, comprising:
an electron generating source for generating electrons;
a specimen chamber which is irradiated with the electrons generated by said electron generating source;
a specimen exchange chamber arranged on said specimen chamber so that the specimen is inserted into said specimen chamber from said specimen exchange chamber;
a first oil-sealed rotary vacuum pump for main pumping and roughing, said first oil-sealed rotary vacuum pump is connected to said specimen chamber to evacuate air in said specimen chamber;
a second oil-sealed rotary vacuum pump connected through a suction pipe to said specimen exchange chamber to evacuate air in said specimen exchange chamber; and
a purge gas supply means for supplying a small quantity of

purge gas to said suction pipe of said second oil-sealed rotary vacuum pump.

4,889,996

METHOD FOR OBTAINING A RADIATION IMAGE

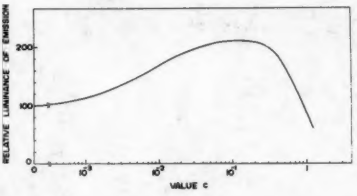
Noboru Kotera; Shusaku Eguchi, both of Odawara, and Norio Miura, Isehara, all of Japan, assignors to Kasei Optonix, Ltd., Japan

Continuation of Ser. No. 696,843, Jan. 29, 1985, abandoned, which is a continuation of Ser. No. 504,737, Jun. 16, 1983, abandoned, which is a division of Ser. No. 317,779, Nov. 3, 1981, abandoned, which is a continuation-in-part of Ser. No. 159,848, Jun. 16, 1980, abandoned. This application Jun. 30, 1986, Ser. No. 881,522

Claims priority, application Japan, Jun. 19, 1979, 54-77290; Jun. 19, 1979, 54-77291

Int. Cl.[4] C09K *11/61, 11/62*

U.S. Cl. 250—484.1 5 Claims



1. A method for obtaining a radiation image of an object, said method comprising the steps of causing a radiation image storage panel to absorb an ionizing radiation transmitted through said object and then exposing the panel to light of wavelength ranging from 450 to 800 nm to cause the panel to release radiation energy stored therein as fluorescent light,

wherein said panel has a fluorescent layer of a rare earth element activated complex halide stimulable phosphor represented by the formula

$$BaF_2.aBaX_2.bNaF.cMe^{II}F_2.dGaF_3:eLn$$

wherein X is at least one halogen selected from the group consisting of chlorine, bromine and iodine, Me^{II} is at least one divalent metal selected from the group consisting of beryllium, calcium and strontium Ln is at least one rare earth element selected from the group consisting of a divalent europium (Eu^{2+}), cerium and terbium, and a, b, c, d and e are numbers satisfying the conditions of $0.90 \leqq a \leqq 1.05$, $0 \leqq b \leqq 0.9$, $0 \leqq c \leqq 1.2$, $0 \leqq d \leqq 0.03$, $10^{-6} \leqq e \leqq 0.03$ and $b+d \neq 0$, respectively.

4,889,997

PROCESS AND DEVICE FOR MEASURING AND PROCESSING THE DISPLACEMENTS BETWEEN TWO OR MORE POINTS IN STRUCTURES, BUILDINGS, MACHINERY OR THE LIKE

Andrea Tomiolo, Milan, Italy, assignor to Carpio S.r.l., Italy

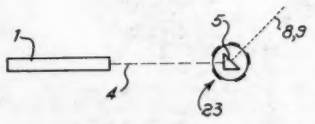
Filed Dec. 21, 1987, Ser. No. 135,828

Claims priority, application Italy, Dec. 23, 1986, 22832 A/86

Int. Cl.[4] G01B *11/14*

U.S. Cl. 250—561 25 Claims

1. A process for the real time measurement of differential changes in the position of a plurality of structures, said process comprising generating a laser beam at a predetermined central location with respect to said plurality of structures, rotating said laser beam through a predetermined arc, by refracting said laser beam by means of a rotating prism, screening said rotating laser beam except at points in said predetermined arc corresponding to said targets, providing each of said plurality of structures with a target located at a position subtended by said arc whereby said rotating of said laser beam causes said laser beam to sequentially strike said targets corresponding to said plurality of structures, determining a reference point on each of said targets corresponding to the point on said target struck by said rotating laser beam, obtaining a signal proportional to



the location of subsequent points on said target struck by said laser beam upon subsequent rotation thereof, whereby said proportional signals correspond to subsequent changes in the position of said structures, and processing said proportional signals so as to provide an evaluation of the extent of said differential changes in position of said plurality of structures.

4,889,998

APPARATUS WITH FOUR LIGHT DETECTORS FOR CHECKING SURFACE OF MASK WITH PELLICLE

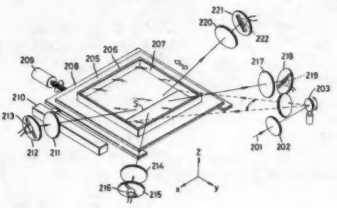
Fuminori Hayano, Fujisawa; Kazunori Imamura, Tokyo; Sunao Murata, Kawasaki, and Kinya Kato, Tokyo, all of Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Jan. 26, 1988, Ser. No. 148,691

Claims priority, application Japan, Jan. 29, 1987, 62-17155; Feb. 25, 1987, 62-42247; May 12, 1987, 62-115649; May 18, 1987, 62-119079

Int. Cl.[4] G01N *21/88, 21/32*

U.S. Cl. 250—563 9 Claims



1. An apparatus for detecting foreign particles on a surface of a substrate, comprising:

a supplying means for supplying a light beam which forms a light spot repeatedly shifting along a scanning line on the surface of said substrate, to the surface of said substrate from an oblique direction;

a shifting means for shifting said substrate to vary a position of said scanning line;

first and second light detectors arranged in a first plane which includes said scanning line and is perpendicular to the surface of said substrate and positioned symmetrically with respect to an incident plane of said light beam passing through a center of said scanning line, said first and second light detectors generating photoelectric outputs, respectively;

third and fourth light detectors arranged in a second plane parallel to said first plane and positioned symmetrically with respect to said incident plane, said third and fourth light detectors generating photoelectric outputs, respectively;

an operating means for receiving the photoelectric outputs of said first and second light detectors and for generating

an output signal representing a logic sum of said photoelectric outputs; and

a discriminating means for receiving the output signal of said operating means and the photoelectric outputs of said third and fourth light detectors and for discriminating the presence of a foreign particle on the basis of a logic product of said output signal and said photoelectric outputs of said third and fourth light detectors.

4,889,999

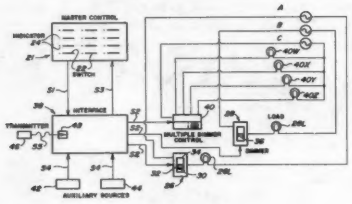
MASTER ELECTRICAL LOAD CONTROL SYSTEM

Michael J. Rowen, Center Valley, Pa., assignor to Lutron Electronics Co., Inc., Coopersburg, Pa.

Filed Sep. 26, 1988, Ser. No. 249,543

Int. Cl.[4] H01H *47/00*; H02P *5/00*

U.S. Cl. 307—31 **33 Claims**



1. A system to control power from an a.c. line to a plurality of loads, including lighting loads, comprising, in combination,

(a) a plurality of wallbox dimmers, each controlling power to one of said lighting loads, each of said dimmers comprising, in proximate relationship,

(i) a dimming circuit to control power to said load,

(ii) dimmer control means to provide a dimmer control signal to said dimming circuit for determining power to said load, and

(iii) switch means in electrical communication with said dimming circuit to turn power to said load off and on to a level determined by said dimming circuit;

(b) master control means to provide, for each of said loads, a master control signal for determining power to said load; and

(c) isolation means to accept said master control signals from said master control means and provide output signals to corresponding dimming circuits.

4,890,000

CONTROL CIRCUIT OF THE DECORATIVE LIGHT SETS

George Chou, No. 8-3, Lane 85, K'ang-Ling Street, Hsin-Chu Hsien, Chu-Tung Chen, Taiwan

Filed Oct. 13, 1988, Ser. No. 257,008

Int. Cl.[4] H05B *37/02*

U.S. Cl. 307—36 **1 Claim**

1. A control circuit for controlling the illumination of a plurality of strings of series connected lamp bulbs to generate a decorative light pattern, comprising:

a source of alternating current;

rectifier means for converting alternating current from said source into direct current, said rectifier means having positive and negative output poles through which said direct current is supplied;

a plurality of separate strings of lamps, each of said strings containing a plurality of lamps connected in series, one end of each of said strings being connected in common, said common connection being connected to said positive output pole of said rectifier means;

a plurality of SCRs, equal in number to the number of said plurality of lamp strings, each of said SCR having anode, cathode and gate electrodes, one each of said SCRs having said anode thereof connected to the end opposite said one end of one of said lamp strings, the cathodes of each said SCRs being connected in common to said negative output pole of said rectifier means;

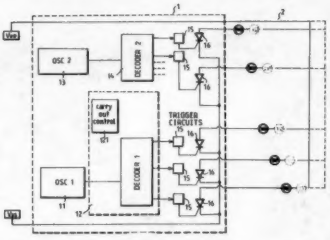
a first oscillator;

a first decoder receiving the output of said first oscillator and providing a first sequence of positive digital output signals, said first decoder having a plurality of output ports, each of said output ports providing a separate one of said positive digital signals of said first sequence;

a second oscillator;

a second decoder receiving the output of said second oscillator and providing a second sequence of positive digital output signals;

a carry-out control receiving said second sequence of positive digital output signals, said carry-out control having a plurality of output ports, each of said carry-out control output ports providing a separate one of said positive digital signals of said second sequence;



a plurality of diodes, each of said diodes having anode and cathode electrodes, each of said diode anodes being connected to a separate one of said output ports of said first decoder and of said carry-out control; and

a plurality of trigger circuits, one each for each of said SCRs, each said trigger circuit having a first resistor and a second resistor connected in series, each of the junction points of said first and second resistors being connected the gate electrode of one of said SCRs, the ends of said first resistors opposite said junction points being connected in common to said negative pole of said rectifier means, the end of each said second resistor opposite the junction point thereof with one of said first resistors being connected both to a cathode of a separate one of said diodes connected to said output ports of said first decoder and to a cathode of a separate one of said diodes connected to said output ports of said carry-out control.

4,890,001

ELECTRICAL CIRCUIT FOR SELECTIVELY ACTIVATING ELECTRICAL DEVICES

Lothar Eickelmann, Dortmund, Fed. Rep. of Germany, assignor to Hageag Holding Inc., Meggen, Switzerland

Filed Feb. 17, 1989, Ser. No. 312,608

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1988, 3805013

Int. Cl.[4] H01H *47/22*

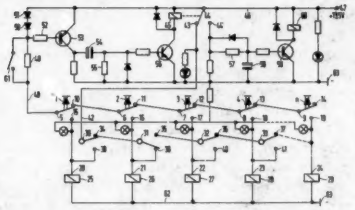
U.S. Cl. 307—38 **5 Claims**

1. An electrical circuit assembly for selectively activating one of various electrical devices, each device having a corresponding pushbutton switch, wherein activation of the pushbutton switch assigned to the selected device activates the selected device and deactivates a previously selected device, the circuit assembly comprising:

a plurality of pushbutton switches having a changeover contact, a rest contact, and an operating contact, the changeover contact of a first pushbutton switch being connected to a first pole of a direct current source;

a relay corresponding to each pushbutton switch, each relay having a relay coil, a changeover contact, a rest contact, an operating contact, and an additional contact for switching the electrical device, a first end of each relay coil being connected to the operating contact of the corresponding pushbutton switch and the operating contact of the relay, a second end of each relay coil being connected to a second pole of the direct current source, the changeover contact of a first relay being connected to the first pole of the direct current source by means of an additional relay;

a series resistance connected between the changeover contact of the first pushbutton switch and the first pole of the direct current source, the resistance being great



enough to prevent sufficient current to activate the relay when activation of the pushbutton switch connects the changeover contact to the operating contact;

a differentiating device that differentiates a voltage dependant on the current through the series resistance and activates the additional relay for a short time to disconnect the direct current source from the relays for the short time; and

a slow-release holding relay activated by the additional relay during the short time that the direct current source is disconnected from the relays, the slow release relay connecting the changeover contact of the first pushbutton switch directly to the direct current source by short circuiting the series resistance.

4,890,002

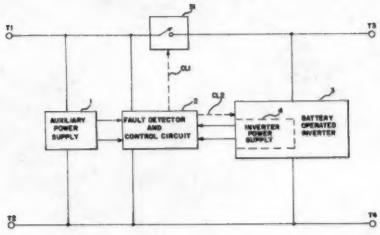
LINE VOLTAGE FAULT DETECTOR FOR APPLIANCE PROTECTION

Louis W. Schornack, Park Ridge, Ill., assignor to Perma Power Electronics, Inc., Chicago, Ill.

Division of Ser. No. 118,257, Nov. 9, 1987, Pat. No. 4,890,005. This application Oct. 14, 1988, Ser. No. 257,951

Int. Cl.[4] H02J *4/00*

U.S. Cl. 307—66 **11 Claims**



1. In a line voltage surge protection circuit for protecting an electrically-powered appliance, said circuit having input power terminal means adapted for connection to A.C. power lines, output terminal means adapted for connection to an electrical load, switching means operable between a closed condition for coupling an A.C. voltage delivered to said input terminal means to said output terminal means and to an open condition at least substantially attenuating the delivery of input voltage to said output terminal means, a line voltage abnormality sensing circuit responsively coupled to a chosen one of said terminal means for producing an abnormality-indicating control signal condition responsively to the departure of the input voltage waveform developed across said chosen terminal means beyond at least one given limit and control means responsively coupled to said sensing circuit and actuatingly coupled to said switching means for operating said switching means from said closed to said open condition responsively to appearance of said abnormality-indicating signal condition, the improvement wherein:

said abnormality-sensing circuit includes waveform generating means for producing a rate-of-change output waveform having an instantaneous value which varies generally according to the time rate of change of a sinusoidal power line voltage of given frequency supplied to said input terminal means so as to provide said output waveform as a waveform having no nulls while spanning the axis crossings of said input terminal voltage and which increases abruptly in response to a phase-coherent increase in the rate-of-change of said terminal input voltage attendant to any axis crossing; and

detector circuit means responsive to said rate-of-change output waveform for providing said abnormality-indicating signal responsively to an increase of said rate-of-change waveform beyond a given threshold value.

4,890,003

CAPACITIVELY BUFFERED POWER SUPPLY FOR AN ELECTRONIC DEVICE

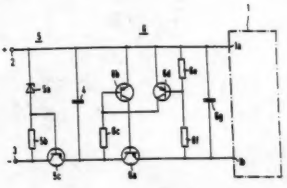
Rudolf Seibert, Kirchheim-Heimstetten, and Claus Cramer, Nuremberg, both of Fed. Rep. of Germany, assignors to Siemensaktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Nov. 8, 1988, Ser. No. 268,485

Claims priority, application Fed. Rep. of Germany, Nov. 10, 1987, 3738183

Int. Cl.[4] H02J *9/00*

U.S. Cl. 307—66 **4 Claims**



1. A power supply unit for temporarily supplying power to an electronic device having an operating voltage when an outside voltage supply is interrupted, the circuit comprising:

(a) first and second input terminals for connection to said outside voltage supply;

(b) first and second output terminals for supplying power to the electronic device;

(c) a stand-by capacitor coupled to said first and second input terminals, said stand-by capacitor being constantly loaded to a load voltage higher than the operating voltage of the electronic device;

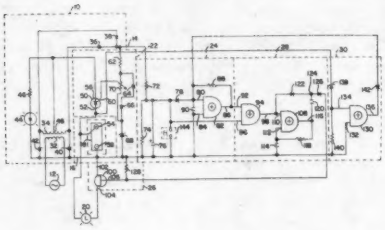
(d) a voltage stabilizing circuit coupled between the stand-by capacitor and the output terminals for reducing said load voltage to the operating voltage during the interruption of the outside voltage supply, said stabilizing circuit further maintaining the reduced load voltage at said operating voltage while the load voltage is greater than or equal to said operating voltage.

4,890,004

EMERGENCY LIGHT CONTROL AND BATTERY CHARGING SYSTEM

Howard L. Beckerman, 151 Ivy Hill Rd., Red Bank, N.J. 07701

Filed Nov. 21, 1988, Ser. No. 273,487
Int. Cl.[4] H02J *7/00, 9/00*
U.S. Cl. 307—66 **12 Claims**



1. A system adapted for connection to a source of conventional electrical AC power, a battery, and a light, said system being arranged to keep said battery charged from said AC power source and in the event of a disruption in said AC power source to energize said light from said battery, said system comprising:

power supply means for converting said conventional electrical AC power to DC power between a supply line and a reference line;

charging means including switched voltage regulating means coupled between said power supply means and said battery for selectively charging said battery to maintain the battery voltage within a predetermined range;

latch means coupled to said power supply means for providing a latch signal upon the initial connection of said system to said AC power source; and

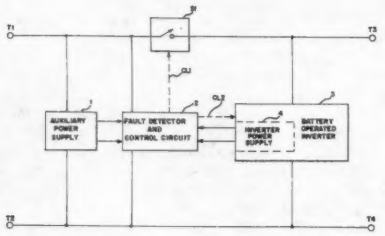
enable means coupled to said power supply means and to receive said latch signal for energizing said light from said battery when said latch signal is present and said DC power is absent, said enable means including a field effect transistor in series with said light and voltage doubling means connected to the gate of said field effect transistor.

4,890,005

STANDBY POWER SUPPLY LINE VOLTAGE FAULT DETECTOR

Louis W. Schornack, Park Ridge, Ill., assignor to Perma Power Electronics, Inc., Chicago, Ill.

Filed Nov. 9, 1987, Ser. No. 118,257
Int. Cl.[4] H02J *9/00*
U.S. Cl. 307—87 **22 Claims**



1. In an A.C. power supply having input terminal means adapted for connection to A.C. power lines, output terminal means adapted for connection to an electrical load, a battery-operated inverter operable to supply power to said output terminal means, switching means operable between a first state for connectingly supplying power directly from said input terminal means to said output terminal means and to a second state breaking said connection and supplying electrical power from said inverter to said output terminal means, a power line voltage abnormality sensing circuit coupled to a chosen one of said terminal means for producing a normality-indicating signal condition responsively to a sensing of a terminal voltage condition across said chosen terminal means within at least one given amplitude limit and an abnormality-indicating signal condition responsively to a sensing of said terminal voltage condition outside of said limit, and control circuit means responsive to said abnormality sensing circuit signal conditions for actuating said switching means to one of said states responsively to receipt of said normality-indicating signal condition and to the other of said states responsively to receipt of said abnormality-indicating signal condition, the improvement comprising:

waveform-producing circuit means associated with said abnormality sensing circuit and responsively coupled to said chosen terminal means for providing an output waveform of non-zero amplitude spanning the axis crossing regions of the terminal voltage waveform across said chosen terminal means and including means for causing said output waveform to respond to failure of said terminal voltage during any axis crossing thereof by an abrupt change in output waveform amplitude initiated synchronously with the occurrence of said failure, and

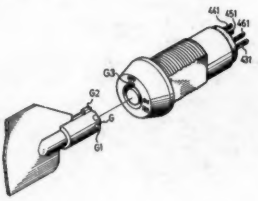
detector circuit means responsively coupled to said waveform-producing circuit means for providing said abnormality-indicating signal condition responsively to said abrupt change in output waveform amplitude beyond a given first threshold value.

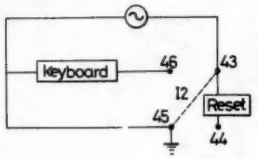
4,890,006

ROTARY LOCK SWTICH FOR SWITCHING AND RESETTING A COMPUTER

Chao-Kuei Huang, No. 6, Lane 5, Chung Yang Rd., Tai Shan Hsiang, Taipei Hsien, Taiwan

Continuation-in-part of Ser. No. 73,702, Jul. 15, 1987, abandoned. This application Sep. 7, 1988, Ser. No. 241,239
Int. Cl.[4] H01H *21/68, 27/06*
U.S. Cl. 307—112 **4 Claims**





1. A lock switch for a computer, said lock switch being operable by a key turnable between an OFF position and an

ON position to respectively switch off and switch on a power supply for said computer,

said lock switch being structured such that said key can only be inserted only into said lock switch or removed therefrom when said key is in said off position,

wherein said lock switch is structured to define a RESET position to which said key can be turned,

a reset function of said computer only being actuatable when said key is turned to said RESET position,

said ON position being positioned between said OFF position and said RESET position, and

said lock switch being provided with spring means for biasing said key from said RESET position to said ON position.

4,890,007

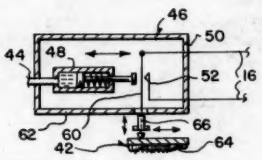
CARPET MAT SWITCH

Thuan D. Vu, 323 18 St., Brooklyn, N.Y. 11215, and George Spector, 233 Broadway Rm 3815, New York, N.Y. 10007

Filed Nov. 4, 1988, Ser. No. 267,241

Int. Cl.[4] G08B *13/10*

U.S. Cl. 307—118 **4 Claims**



1. A carpet mat switch system which comprises:

(a) a mat structure located on a floor;

(b) a first electrical circuit connected between a power source and said mat structure;

(c) means carried in said mat structure for closing said first electrical circuit in response to a person standing upon said mat structure;

(d) an electrical appliance;

(e) a second electrical circuit connected between the power source and said electrical appliance;

(f) means connected to said first electrical circuit for closing said second electrical circuit for activating said electrical appliance wherein said mat structure includes;

(g) a base member having a pair of side walls, said base member placed upon the floor;

(h) a plate carried on said base member between said side walls;

(i) a carpet rug carried on said plate wherein said first closing means includes:

(j) an elongated sealed fluid filled tube disposed in a zig-zag fashion between said base member and said plate; and

(k) an actuating unit connected between said tube and said first electrical circuit whereby when the person stands upon said carpet rug, said plate will squeeze said tube against the base member causing said actuating unit to close said first electrical circuit; wherein said actuating unit includes:

(l) a housing;

(m) a spring biased piston disposed within said housing and fluidly connected to the end of said tube; and

(n) an electric switch connected to said first electrical circuit, said electric switch mechanically operated by said piston, wherein said second closing means includes:

(o) a solenoid electrically connected to said first electrical circuit;

(p) an on-off switch connected to said second electrical circuit, said on-off switch mechanically operated by said solenoid; and

(q) a manual override lever mechanically connected to said on-off switch to by-pass said solenoid; wherein said actuating unit further includes:

(r) a manual override lever shaft directly connected to said electric switch which extends through a wall of said housing and is covered by an overhang of said carpet rug so that the person can manually operate said electric switch without stepping on said mat structure; and

(s) a sleeve slideable on said lever shaft so that the person can push said sleeve into said wall of said housing to lock said electric switch and turn off said actuating unit.

4,890,008

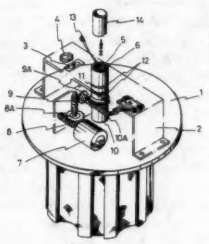
MULTI-FUNCTION AUTOMATIC REVOLVING CHRISTMAS TREE BASE

Ven-Chung Chu, 3F, N.3, Lane 42, Yu Hsi Street, Yung Ho, Taipei, Taiwan

Filed Oct. 22, 1986, Ser. No. 921,698

Int. Cl.[4] A47G *33/12*

U.S. Cl. 307—149 **3 Claims**



1. A rotation-changing Christmas tree base, comprising:

a base;

a bridge secured at said base;

a revolving cylinder mounted at said base;

a driving mechanism between said base and said bridge for actuation of said revolving cylinder;

a two-way exchanging mechanism operatively connected to said revolving cylinder;

wherein said bridge is of inverted "U" shape with each one of the two ends of said bridge being fixed near the edge of said base, said bridge having a central round hole and peripheral power-cord input holes;

at least one power selection switch secured at said bridge;

said revolving cylinder being located at the centre of said base, with the top end of said revolving cylinder penetrating through said central round hole of said bridge, and the top end of said revolving cylinder having a slot formation;

at least two conductive copper collars arranged at the outer wall of said revolving cylinder, with part of each collar being embedded in the wall of said revolving cylinder, and with part of each collar extending upwards for connection with a socket;

said socket connected with conductive wires to said collars;

a driving guide rod connected at the outer wall of said revolving cylinder;

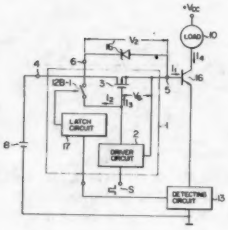
said driving mechanism located between said bridge and said base including a DC motor adapted to drive said revolving cylinder, and including three sets of toothed worm gears and associated worm speed reducer gearing.

4,890,009

MONOLITHIC INTEGRATED CIRCUIT DEVICE

Hideki Miyazaki; Kenichi Onda, and Yasuo Matsuda, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 25, 1988, Ser. No. 185,398
Claims priority, application Japan, Apr. 30, 1987, 62-104297; Apr. 30, 1987, 62-104298
Int. Cl.[4] H03K *3/01, 5/08;* G05F *1/40*
U.S. Cl. 307—270 10 Claims



1. A monolithic integrated circuit device comprising:
first and second output terminals;
switching means having first and second main electrodes and a control electrode, said first and second main electrodes being connected with said first and second output terminals, respectively, so that said switching means is connected across said first and second output terminals, said first and second output terminals being connectable with an external load and an external power source so as to form a closed circuit along with said switching means;
driving means for generating a first drive signal in response to an externally applied control signal, the output of said driving means being electrically connected with the control electrode of said switching means for supply of said first drive signal to said switching means so that said switching means selectively passes therethrough, in response to said first drive signal, an output current to be supplied to said external load from said external power source;
a third output terminal; and
circuit means for electrically interconnecting said third output terminal and said driving means for derivation of electric energy from said driving means as a second drive signal for supply of said second drive signal to an external circuit via said third output terminal, said second drive signal being in phase with said first drive signal and having small energy as compared with that of said output current flowing through said switching means.

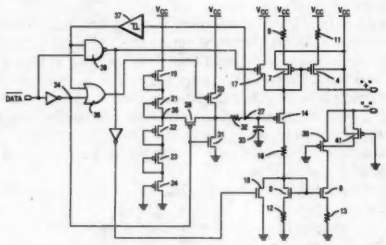
10. A power conversion apparatus comprising:
a power switching device for supplying therethrough power from a first power source to a load;
sensor means for detecting occurrence of an overcurrent in a circuit path which circuit path includes said power switching device, said sensor means generating a sense signal upon detection of occurrence of an overcurrent current in said circuit path;
a monolithic integrated circuit device including
first and second output terminals,
switching means having first and second main electrodes and a control electrode, said first and second main electrodes being connected with said first and second output terminals, respectively, so that said switching means is connected across said first and second output terminals, said first and second output terminals being connectable with a second power source and said power switching device, respectively, so as to form a closed circuit along with said switching means,
a driver circuit for generating a common drive signal, in response to an externally applied control signal, the output of said driver circuit being connected with the control electrode of said switching means so that said common drive signal is supplied to said control electrode of said switching means as a first drive signal to selectively pass through said switching means, in response to said first drive signal, an output current to be supplied to said power switching device from said second power source,
a third output terminal, and
circuit means for electrically interconnecting said third output terminal and said driver circuit so that said common drive signal is also supplied through said circuit means to said third output terminal as a second drive signal, said second drive signal being in phase with said first drive signal and having small energy as compared with that of said output current flowing through said switching means, said circuit means including a switch circuit between the output of said driver circuit and said third output terminal, said switch circuit being arranged so as to be closed in response to said sense signal from said sensor means thereby to supply said second drive signal to said third output terminal; and
a zener diode connected across said third and second output terminals to receive said second drive signal to limit the voltage difference between the control electrode and the second main electrode of said switching means to a predetermined value when an overcurrent in said circuit path occurs.

4,890,010

MATCHED CURRENT SOURCE SERIAL BUS DRIVER

Alexander J. Neudeck, West Lafayette, Ind., and Ernest W. Cordan, Jr., Colorado Springs, Colo., assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 22, 1988, Ser. No. 288,655
Int. Cl.[4] H03K *17/16*
U.S. Cl. 307—270 12 Claims



1. A CMOS integrated circuit bus driving transmitter, comprising:
a first current path between high and low supply voltages including a serial connection of a p-channel reference transistor and a n-channel reference transistor;
a first current source connected to conduct between the high supply voltage and a high line of the bus in matched response to a control signal shared with the p-channel reference transistor;
a second current source connected to conduct between the low supply voltage and a low line of the bus, complementary to the high line of the bus, in matched response to a control signal shared with the n-channel reference transistor; and
means for selectively enabling current flow in the first path at a controlled rate of change.

4,890,011

ON-CHIP SUBSTRATE BIAS GENERATING CIRCUIT HAVING SUBSTRATE POTENTIAL CLAMP AND OPERATING METHOD THEREFOR

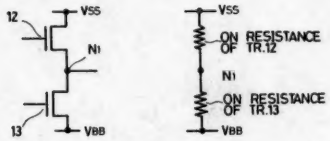
Hideshi Miyatake, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

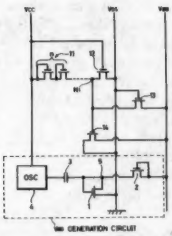
Filed May 11, 1988, Ser. No. 192,576

Claims priority, application Japan, May 12, 1987, 62-115291

Int. Cl.[4] H03K *3/354;* **H01L** *19/00, 27/04*

U.S. Cl. 307—296.2 **18 Claims**





1. For a semiconductor device including a semiconductor substrate on which field effect transistors are formed, said device including a power supply node, a ground node and a substrate bias node, parasitic capacitance being formed between said power supply node and said substrate bias node, said device further including a substrate bias generating circuit coupled to said power supply node and said ground node for generating a substrate bias voltage having a predetermined value and applying said substrate bias voltage to said substrate bias node, a substrate potential clamping circuit, comprising:

(a) reference means for establishing a reference potential;

(b) measurement means connected to said power supply node for measuring the magnitude of an external voltage applied thereto; and

(c) control means responsive to said measurement means and said reference means for clamping the substrate voltage of said substrate potential node to said ground potential while thc external voltage magnitude exceeds said reference potential.

4,890,012

AN INTEGRATED CONTROLLED FET SWITCH

Josef Stockinger, Munich, Fed. Rep. of Germany, assignor to SGS-Thomson Microelectronics GmbH, Munich, Fed. Rep. of Germany

Filed May 27, 1988, Ser. No. 199,836

Claims priority, application Fed. Rep. of Germany, May 27, 1987, 3717922

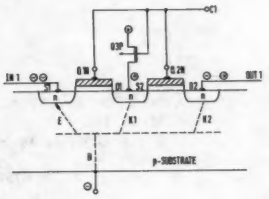
Int. Cl.[4] H03K *17/16*

U.S. Cl. 307—296.5 **20 Claims**

1. In a switch means designed as an integrated circuit comprising: a signal input connected to a first controllable switch in the form of a first FET which switches off completely only within a predetermined input voltage range and which, upon receiving a control signal connects through an input signal;

a second controllable switch in the form of a second FET connected between the first FET and an output of the switch means, said second FET being controlled in synchronism with the first FET; and,

a third FET, serving as a clamp FET, connected between the common node of said first and second FETs and a point of constant voltage, said third FET in the conductive state clamping the node between the first FET and the second FET at the constant voltage and being switched in time synchronism with the first FET and the second FET to a state opposite that of the first FET and the second FET; the improvement wherein:



the first FET and the second FET are of the same conductivity type and the third FET is of the opposite conductivity type;

the gate electrodes of all of the first, second and third FETs are driven by control signals of the same polarity; and

the point of constant voltage is the negative pole of an operating voltage source for the switch means if the third FET is of the n-channel type, and is the positive pole of the operating voltage source if the third FET is of the p-channel type.

4,890,013

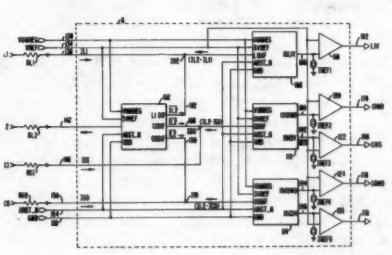
CIRCUIT FOR SENSING VOLTAGES BEYOND THE SUPPLY VOLTAGE OF THE SENSING CIRCUIT

Christopher G. Arcus, San Jose, Calif., assignor to IXYS Corporation, San Jose, Calif.

Filed Jun. 17, 1988, Ser. No. 208,310

Int. Cl.[4] H03K *5/24*

U.S. Cl. 307—355 **18 Claims**



1. In a circuit for sensing a voltage existing between first and second nodes of the circuit, wherein components comprising the circuit operate from a power supply which generates first and second power supply voltages which comprise ordinary voltage limits of the power supply, an apparatus for sensing voltages between the first and second nodes that may be beyond the voltage limits of the power supply comprising:

first node sensing means for sensing a fir-t input voltage at the first node;

first input voltage converting means, coupled to the first node sensing means, for converting the first input voltage into a first input current;

second node sensing means for sensing a second input voltage at the second node;

second input voltage converting means, coupled to the second node sensing means, for converting the second input voltage into a second input current;

comparing means, coupled to the first input voltage converting means and to the second input voltage converting means, for comparing the first input current to the second input current and for generating a common signal when the first input current exceeds the second input current by a prescribed amount and when the second input current exceeds the first input current by a prescribed amount.

4,890,014

SEQUENTIAL OPERATION DIFFERENTIAL CURRENT AMPLIFIER

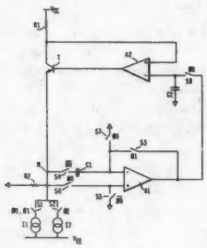
Serge Ramet, Grenoble, France, assignor to SGA-Thomson Microelectronics S.A., Gentilly, France

Filed Sep. 20, 1988, Ser. No. 246,757

Claims priority, application Japan, Sep. 21, 1987, 62-13333

Int. Cl.[4] H03K *5/24*

U.S. Cl. 307—355 **3 Claims**



1. A comparison device for currents provided with a differential current amplifier with offset compensation and with sequential operation according to a preliminary phase (Φ0) and first and second operating phases (Φ1, Φ2), said comparison device being connectable to a high voltage source (VCC), a low voltage source (VEE) and an intermediate voltage source and comprising:

a first resistor (R1) connected between the high voltage source and a connection node (N) ;

a first current source (I1) connected between the low voltage source and said node through a first switch (S1) closed during the first phase (Φ1) ;

a second current source (I2) connected between the low voltage source and said node through a second switch (S2) closed during the second phase (Φ2) ;

a first differential amplifier (A1), a first input (−) of which is connected during said operating phases with said node through a first capacitor (C1), the second input (+) of which is connected during said operating phases with the intermediate voltage source, and the output of which is connected with the first input by a third switch (S3) closed during the first phase;

a second resistor (R2) having a high value with respect to the first resistor connected between said node and the intermediate voltage source ; and

servo-control means operating during said preliminary phase (Φ0) for urging, when the first switch is closed, the voltage of said node to be equal to the intermediate voltage source and the current in the first resistor (R1) to be roughly equal to the current of the first current source.

4,890,015

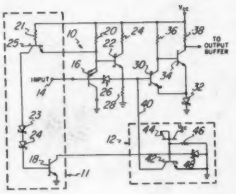
METHOD AND CIRCUITRY FOR CONTROLLING THE COMPENSATION OF NEGATIVE INTERNAL GROUND VOLTAGE FLUCTUATIONS

Janet L. Wise, Sherman, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 29, 1988, Ser. No. 149,776

Int. Cl.[4] H03K *19/013, 19/088*

U.S. Cl. 307—443 **18 Claims**



1. A circuit for controlling the compensation of electrical transients in an integrated circuit comprising:

an input circuit including an output transistor having a control terminal for receiving an input signal and providing an output signal in response to said input signal;

a compensation circuit coupled to said input circuit for controlling switching of said output transistor in response to said electrical transients, said compensation circuit including a compensation transistor having a first collector coupled to said control terminal, a first emitter coupled to a reference node and a first base for receiving a control signal;

a first transistor having a second base, a second collector coupled to said first base to supply said control signal to said compensation circuit and a second emitter coupled to said reference node, said first transistor switchably controlling said compensation circuit; and

a second transistor having a third collector coupled to said second base, a third base coupled to a source of supply voltage and to said input circuit and a third emitter coupled to said input circuit, said third base responsive to the voltage level of said input signal for switchably regulating said first transistor.

4,890,016

OUTPUT CIRCUIT FOR CMOS INTEGRATED CIRCUIT WITH PRE-BUFFER TO REDUCE DISTORTION OF OUTPUT SIGNAL

Fuminari Tanaka, and Satoshi Nonaka, both of Tokyo, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 24, 1988, Ser. No. 197,979

Claims priority, application Japan, May 29, 1987, 62-133774

Int. Cl.[4] H03K *13/013, 17/16, 17/04, 19/017*

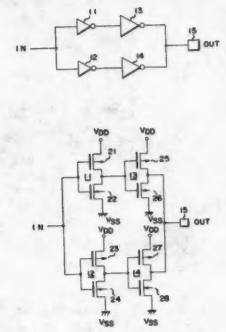
U.S. Cl. 307—443 **24 Claims**

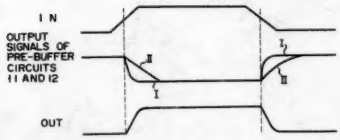
1. An output circuit of a CMOS semiconductor integrated circuit comprising:

a plurality of CMOS pre-buffer means for receiving the same input signal and outputting a plurality of output signals with different delay times, each including P- and N-channel MOS transistors, each of the P- and N-channel MOS transistors of at least one of said pre-buffer means being formed differently in that the channel width is relatively narrow and channel length is relatively long to provide said pre-buffer means with a relatively small current driving capacity compared to the remaining pre-buffer means;

a plurality of CMOS output buffer means, each respectively connected to a corresponding one of said plurality of pre-buffer means, for receiving the plurality of output signals with different delay times from said pre-buffer means and for outputting the plurality of output signals

with a greater current driving capacity than the pre-buffer means; and





a signal output terminal commonly connected to the output terminals of said plurality of output buffer means for providing an OUT signal.

4,890,017

CMOS-BICMOS GATE CIRCUIT

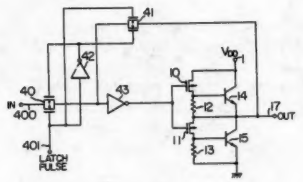
Ikuro Masuda, Hitachi; Kazuo Kato, Ibaraki; Takao Sasayama; Yoji Nishio, both of Hitachi; Shigeo Kuboki, Nakaminato, and Masahiro Iwamura, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 45,216, Apr. 30, 1987, which is a continuation of Ser. No. 513,056, Jul. 12, 1983. This application Dec. 1, 1987, Ser. No. 127,184

Claims priority, application Japan, Jul. 12, 1982, 57-119815

Int. Cl.[4] H03K *17/04*

U.S. Cl. 307—446 **19 Claims**



1. A semiconductor integrated circuit comprising:

a complementary field effect transistor circuit having a first input terminal, receiving an input signal, and a first output terminal, said complementary field effect transistor circuit being responsive to the input signal to output a first output signal at the first output terminal; and

a composite circuit having a second input terminal connected with the first output terminal and a second output terminal including:

a bipolar output circuit including first and second bipolar transistors, of which the collector-emitter current paths are connected in series to each other, said second output terminal being connected between said first and second bipolar transistors;

a single stage inverter comprised of a first field effect transistor being responsive to the first output signal received at the second input terminal of said composite circuit to output a second output signal to the base of said first bipolar transistor for rendering said first bipolar transistor in an on or off state; and

a single stage non-inverter comprised of a second field effect transistor being responsive to the first output signal to output a third output signal to the base of said second bipolar transistor for rendering said second bipolar transistor in an on or off state in an opposite relation to the on-off state of said first bipolar transistor.

4,890,018

BIPOLAR-COMPLEMENTARY METAL OXIDE SEMICONDUCTOR CIRCUIT

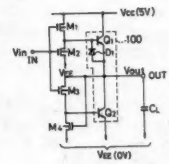
Isao Fukushi, Yokohama, and Takahisa Muroi, Kawasaki, both of Japan, assignors to Fujitsu Limited, Kawasaki and Fujitsu VLSI Limited, Kasugai, both of, Japan

Filed Nov. 10, 1988, Ser. No. 269,417

Claims priority, application Japan, Nov. 16, 1987, 62-288728

Int. Cl.[4] H03K *17/04*

U.S. Cl. 307—446 **10 Claims**



1. A bipolar-complementary metal oxide semiconductor circuit comprising:

first and second power sources;

logic means including first and second metal oxide semiconductor (MOS) transistors serially connected between said first and second power sources at a connection point, gates of said first and second MOS transistor connected to receive an input signal;

a first bipolar transistor having a collector coupled to said first power source, having a base coupled to the connection point between said first and second MOS transistors, and having an emitter;

a second bipolar transistor having an emitter coupled to said second power source, having a collector coupled to the emitter of said first bipolar transistor and used as an output terminal of the circuit, and having a base;

a third MOS transistor connected between the base of said second bipolar transistor and said output terminal of the circuit, said third MOS transistor having a gate receiving said input signal; and

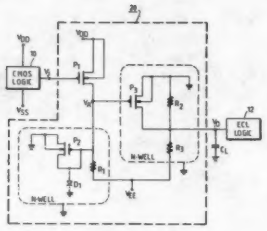
a diode having an anode connected to the emitter of said first bipolar transistor and a cathode connected to the base of said first bipolar transistor.

4,890,019

BILINGUAL CMOS TO ECL OUTPUT BUFFER

Lennox P. J. Hoyte, Brighton, Mass., and Christopher L. Houghton, Wallingford, Vt., assignors to Digital Equipment Corporation

Filed Sep. 20, 1988, Ser. No. 246,991
Int. Cl.[4] H03K *19/092, 17/16, 19/094*
U.S. Cl. 307—475 15 Claims



1. A circuit for converting a first set of logic level signals to a second set of logic level signals comprising:

a. an input terminal connectable to a source of said first set of logic level signals;

b. an output terminal connectable to a device responsive to said second set of logic level signals;

c. first and second power terminals for connection to first and second power supplies, respectively;

d. a first transistor having first, second and gate terminals, said gate terminal connected to said input terminal, said first terminal connected to said first power terminal;

e. a second transistor formed in a grounded well having first, second and gate terminals, said first terminal of said second transistor being grounded and said gate terminal and said second terminal of said second transistor being connected to said second terminal of said first transistor;

f. a third transistor formed in a grounded well and having first, second and gate terminals, said gate terminal connected to said second terminal of said first transistor, said second terminal of said third transistor connected to said output terminal, said first terminal of said third transistor being grounded;

g. a first resistor coupling said gate terminal of said second transistor to said second power supply;

h. a second resistor coupling said second terminal of said third transistor to ground; and

i. a third resistor coupling said second terminal of said third transistor to said second power supply.

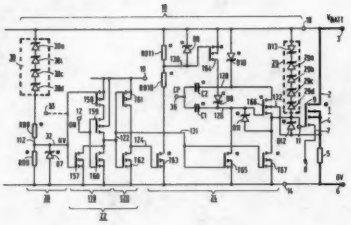
4,890,020

CIRCUIT FOR DRIVING A SEMICONDUCTOR DEVICE WITH PROTECTION AGAINST TRANSIENTS

Philip H. Bird, Sidcup, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 27, 1988, Ser. No. 231,911
Claims priority, application United Kingdom, Jun. 8, 1987, 8713384
Int. Cl.[4] H03K *17/687, 5/153;* H03L *5/00;* B62D *45/00*
U.S. Cl. 307—571 16 Claims

1. A circuit arrangement for driving a semiconductor device adapted to be connected in series with a load across a power supply, the arrangement comprising; means coupled to a control electrode of the semiconductor device for applying appropriate signals to said control electrode in response to a control signal defining a desired state of conduction of the semiconductor device, means coupled to the power supply for detecting the power supply voltage and for causing the semiconductor device to conduct by connecting said control electrode to a first terminal of the power supply when the detecting means detect that the supply voltage exceeds a predetermined threshold value, the means for applying signals comprising an active turn-off device arranged to connect the control electrode to a second terminal of the power supply in response to a control signal indicating that the desired state of conduction is 'off',



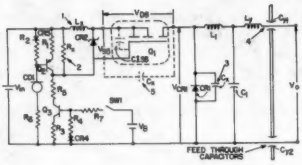
and means coupled to the active turn-off device for disabling said turn-off device when the supply voltage exceeds the threshold value.

4,890,021

NOISE SPIKE ELIMINATION CIRCUIT FOR PULSE WIDTH MODULATORS

Charles S. Walker, Seattle, Wash., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 23, 1989, Ser. No. 299,590
Int. Cl.[4] H02K *17/687*
U.S. Cl. 307—572 6 Claims



1. A dual current source MOSFET turn-on/off circuit including noise spike elimination comprising:

a MOSFET connected between a voltage source and a filter and load;

a turn-off current source comprising a first high gain bipolar transistor connected to a gate electrode of said MOSFET;

a turn-on current source comprising a second high gain bipolar transistor connected in series with said first bipolar transistor;

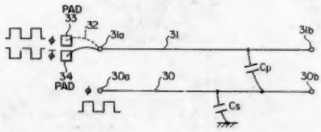
negative feedback means connected to said MOSFET for controlling the rate of change of current conducted by said MOSFET; and

switch means connected to a base electrode of said second bipolar transistor for turning said second bipolar transistor on and off, said turn-on current source overpowering said turn-off current source when said second bipolar transistor is turned on to charge a gate-to-source capacitance of said MOSFET and said turn-off current source discharging said gate-to-source capacitance of said MOSFET when said second bipolar transistor is turned off.

4,890,022
DELAY CIRCUIT DEVICE UTILIZING THE MILLER EFFECT

Hideaki Endo, Tokyo, Japan, assignor to Oki Electric Industry, Ltd., Tokyo, Japan

Filed Mar. 25, 1988, Ser. No. 174,447
Claims priority, application Japan, Mar. 26, 1987, 62-72746
Int. Cl.[4] H03K *5/13, 17/56*
U.S. Cl. 307—602 **6 Claims**

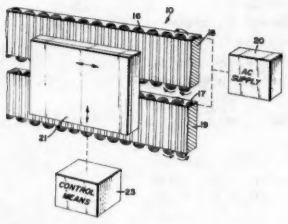


1. A delay circuit device utilizing the Miller effect comprising:
a dielectric layer;
a first elongated signal line disposed on the dielectric layer;
a second elongated signal line spaced at a predetermined distance from the first elongated signal line and disposed in parallel with the first elongated signal line;
wherein a coupling capacitance is formed between the first and the second signal lines;
a first clock signal source electrically connected to the first signal line for supplying a first clock signal to the first signal line; and
a second clock signal source electrically connected to the second signal line for supplying a second clock signal of an opposite phase to that of the first clock signal to the second signal line, whereby the second clock signal is applied to the first signal line via the coupling capacitance so as to delay the phase of the first clock signal of the first signal line.

4,890,023
LINEAR INDUCTION MOTOR SYSTEMS

Walter E. Hinds, 1358 Schuyler Rd., Beverly Hills, Calif. 90210, and Martyn A. Lewis, 1135 Las Pulgas Pl., Pacific Palisades, Calif. 90272

Continuation of Ser. No. 702,899, Feb. 19, 1985, abandoned. This application Mar. 4, 1988, Ser. No. 168,640
Int. Cl.[4] H02K *41/00*
U.S. Cl. 310—12 **8 Claims**

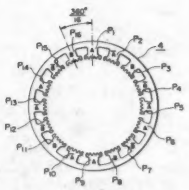


1. In a linear induction motor, a system for controlling relative movement and velocity between a fixed element and a movable element caused by an interaction between a moving magnetic field and a field resulting from currents induced in a conductive member, the system comprising:
(a) a first movable areal member having an area sufficient to span at least a first region and a second region;
(b) first and second stationary areal members disposed along and adjacent to the movement direction of the first movable areal member, the first stationary areal member occupying the first region and the second stationary areal member occupying the second region;
(c) electromagnetic force means coupled to at least one of said stationary areal members for concurrently generating opposed thrust on the movable member in the first region and the second region, the thrust produced in the first region tending to translate the first movable areal member in a first direction, the thrust produced in the second region tending to translate the first movable areal member in a second direction, and;
(d) a secondary winding, the secondary winding being cooperatively connected to the first movable areal member, the secondary winding being variably positionable with respect to the first region and the second region, thereby permitting variation in the relative movement and velocity between the first movable area member and the first and second stationary areal members.

4,890,024
LOW-SPEED HIGH-TORQUE MOTOR

Ichiro Hashimoto; Kosho Ishizaki, both of Hitachi; Hiroshi Hayashida, Mito, and Kunio Miyashita, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 21, 1988, Ser. No. 184,120
Claims priority, application Japan, Apr. 24, 1987, 62-99842
Int. Cl.[4] H02K *37/00*
U.S. Cl. 310—49 R **2 Claims**



1. A hybrid type low-speed high-torque stepping motor comprising a rotor having a large number of teeth formed on an outer circumference thereof, and a stator disposed around the rotor and facing the teeth of the rotor, whose number is n times a number of phases, each pole having formed a plurality of teeth on a surface thereof at a pitch equal to the rotor tooth pitch, adjacent poles are wound by coils in opposite directions, respectively, and provide opposite phases, wherein each of the adjacent magnetic poles have teeth thereof deviated from the motor teeth by about one-half of the tooth pitch, the teeth on each pole being formed in a substantially identical configuration.

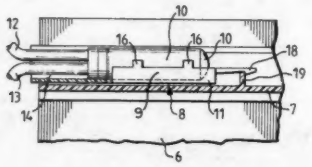
4,890,025
ELECTRIC MOTOR HAVING A PROTECTOR SWITCH

Dieter Hadeler, Oldenburg, and Alfred Appeldorn, Hatten-Sandkrug, both of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-GmbH, Frankfurt, Fed. Rep. of Germany

Filed Jul. 1, 1988, Ser. No. 213,791
Claims priority, application Fed. Rep. of Germany, Jul. 4, 1987, 8709261
Int. Cl.[4] H02K *11/00*
U.S. Cl. 310—68 C **24 Claims**

1. An electric motor having an axis, comprising:
two salient stator poles spaced apart by a pole gap, the poles having windings;
a covering element inserted into the pole gap, the covering element having a recess extending in the direction of the motor axis and having a securing portion, the securing portion including a projection which extends into the recess;
a protector switch associated with the windings, the protector switch having a housing and leads; and

means for mounting the protector switch at a predetermined position on the covering element, the means for mounting including an elongated clamping element which fits into the recess in the covering element and which has an end, the clamping element including receptacle means for providing a receptacle for the housing of the protector switch, holder means for providing a holder for the leads,



and locking means, including a latch member which automatically engages the securing portion when the clamping element is inserted into the recess of the covering element, for engaging the covering element to retain the clamping element in the recess,

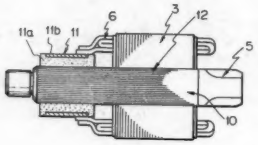
wherein the latch member includes a detent hook at the end of the clamping member, the hook gripping behind the projection.

4,890,026

ELECTRIC MOTOR WITH COMMUTATOR DIRECTLY MOLDED ON MOTOR SHAFT AND METHOD OF CONSTRUCTION

Shuzoo Isozumi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 22, 1988, Ser. No. 158,401
Claims priority, application Japan, Feb. 23, 1987, 62-25751
Int. Cl.[4] H01R *39/16*
U.S. Cl. 310—233 **12 Claims**



4. A method of assembling a D.C. electric motor having an armature shaft, an armature core and a commutator having a tubulaar insulator with conductive segments on the periphery of said tubular insulator, said method comprising the steps of:

A. forming a continuous ridged section on said shaft;

B. mounting said armature core on said ridged shaft section; and

C. molding said tubular insulator directly on said ridged shaft section adjacent to said armature core.

4,890,027

DYNAMIC MOTOR CONTROLLER

John J. Bohner, Manhattan Beach, and Peter L. Conley, Playa del Rey, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

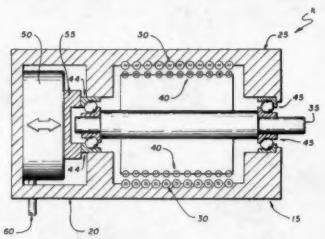
Filed Nov. 21, 1988, Ser. No. 274,248
Int. Cl.[4] H01L *41/08*
U.S. Cl. 310—328 **3 Claims**

1. An improved dynamically controlled motor, said dynamically controlled motor including;

rotor means for supporting a payload and for supporting rotor windings;

housing means for supporting said rotor means and for supporting stator windings;

bearing means for suspending said rotor means within said



housing means while allowing said rotor means to rotate freely with respect to said housing means;

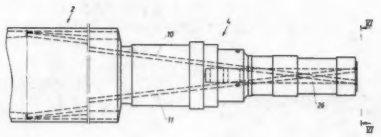
a piezoelectric transducer positioned between said housing means and said bearing means, said piezoelectric transducer applying pressure to said bearing means thereby supplying a braking force to said rotor means.

4,890,028

ROTOR FOR A TURBO-GENERATOR

Tage Persson, Västerås, Sweden, assignor to Asea Aktiebolag, Västerås, Sweden

Continuation-in-part of Ser. No. 325,952, Nov. 30, 1981, abandoned. This application Apr. 25, 1984, Ser. No. 603,879
Int. Cl.[4] H02K *1/22*
U.S. Cl. 310—261 **9 Claims**



1. A generator rotor for a turbo-generator of at least 20 MVA, comprising:

a rotor body of magnetic material having a substantially circular-cylindrical active portion which includes a plurality of winding slots formed therein, the winding slots extending axially along the entire length of said active portion

a rotor winding with parts thereof located in said winding slots;

a first shaft portion extending from one end of said active portion of the rotor body;

a second shaft portion extending from the opposite end of said active portion of the rotor body;

a turbine connecting means on said second shaft portion;

two straight conductor channels, each bored in said active portion of the rotor body and extending along the whole length of said first shaft portion; and

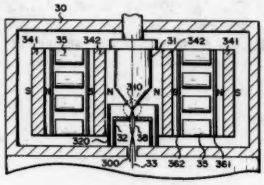
two feeding conductors for the exciting current of said rotor winding, one disposed in each of said channels;

said conductor channels extending through at least part of said active portion while diverging in this and in said first shaft portion in the direction towards said second shaft portion.

4,890,029
ELECTRON BEAM APPARATUS INCLUDING PLURALITY OF ION PUMP BLOCKS

Motosuke Miyoshi, Fujisawa, and Katsuya Okumura, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 3, 1987, Ser. No. 80,668
Claims priority, application Japan, Aug. 20, 1986, 61-194588
Int. Cl.⁴ H01J *7/16*
U.S. Cl. 313—7 **6 Claims**

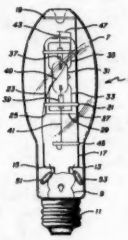


1. An electron beam apparatus comprising:
a vacuum chamber;
an electron gun located within said vacuum chamber; and
an ion pump including a plurality of ion pump blocks arranged around said electron gun, each of said ion pump blocks having a plurality of cylindrical positive electrodes, a plurality of negative getter electrodes located one at each side of said positive electrodes, and magnetic field creating means, located within said vacuum chamber, for producing, in the area of said positive electrodes, a magnetic field containing magnetic field components parallel to the axes of said positive electrodes, said magnetic field creating means including an inner ring magnet located coaxial with the axis of said electron gun, and an outer ring magnet located coaxial with the axis of said inner ring magnet, said cylindrical positive electrodes and said negative getter electrode being located between said inner ring magnet and said outer ring magnet.

4,890,030
METAL HALIDE DISCHARGE LAMP WITH ARC TUBE TEMPERATURE EQUALIZING MEANS

William M. Keeffe, Rockport, and Zeya K. Krasko, Danvers, both of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Jun. 18, 1984, Ser. No. 621,648
The portion of the term of this patent subsequent to Dec. 13, 2005, has been disclaimed.
Int. Cl.⁴ H01J *61/34*
U.S. Cl. 313—25 **8 Claims**

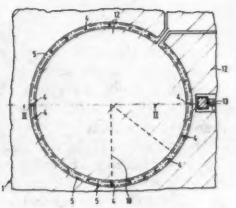


1. A metal halide arc discharge lamp comprising:
(a) a hermetically sealed outer envelope;
(b) an arc tube mounted within said outer envelope, said arc tube having a body and at least one end, said body enclosing an interior containing a gaseous fill and a metal halide additive therein, said body having a predetermined wall loading and during operation of said lamp having a point of highest temperature and a point of lowest temperature, the difference between said highest and lowest temperatures being less than approximately 93 degrees Centigrade when said predetermined wall loading is at least 11.6 watts per square centimeter;
(c) a light-transmissive enclosure mounted within said outer envelope, said enclosure surrounding said arc tube laterally and about at least one end;
(d) a vacuum within said outer envelope;
(e) means for mounting said arc tube and said light-transmissive enclosure; and
(f) means for structurally and electrically completing said lamp.

4,890,031
SEMICONDUCTOR CATHODE WITH INCREASED STABILITY

Jan Zwier, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Continuation of Ser. No. 147,029, Jan. 19, 1988, abandoned, which is a continuation of Ser. No. 793,886, Nov. 1, 1985, abandoned. This application Jan. 18, 1989, Ser. No. 298,819
Claims priority, application Netherlands, Nov. 21, 1984, 8403538; May 24, 1985, 8501490
Int. Cl.⁴ H01J *29/04*
U.S. Cl. 313—409 **14 Claims**



1. A semiconductor device for producing an electron current, which comprises:
a cathode having a semiconductor body with a major surface;
means for increasing the operational stability of said semiconductor device comprising an emission area having at least one group of separate, spaced-apart emission regions at said major surface arranged in a two-dimensional pattern, the area of each said emission region being at most equal to 100 μm^2; in combination with
means for commonly adjusting the operating condition of said group of regions with respect to the emission of electrons, comprising two common electrical connections to at least two corresponding regions of said group.

4,890,032
COLOR DISPLAY TUBE HAVING ELECTRODE CONVERGING MEANS

Jan Bijma, and Antonius J. M. Van Den Beld, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 370,430, Apr. 21, 1982, abandoned. This application Sep. 27, 1988, Ser. No. 251,068
Claims priority, application Netherlands, May 22, 1981, 8102526
Int. Cl.⁴ H01J *29/51, 29/54, 29/62, 29/70*
U.S. Cl. 313—412 **7 Claims**

1. A color display tube comprising an envelope containing a display screen and an electron gun system for producing in-line electron beams and for directing said beams toward said

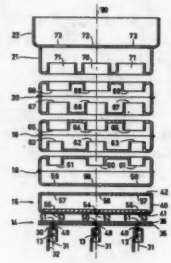
screen, said electron gun system including a triode part for producing the electron beams and focusing electrode means for focusing said beams at the screen, characterized in that said triode part comprises:

a. central and first and second outer cathodes for emitting electrons;

b. a first electrode disposed adjacent the cathodes and having central and first and second outer apertures for passing electrons emitted by the respective cathodes; and

c. a second electrode including an apertured portion disposed opposite the first electrode;

said first electrode having its apertures dimensioned and arranged with respect to the cathodes to effect formation of the electrons emitted by the cathodes into two outer



electron beams and one inner electron beam, each beam having a crossover occurring in the area of the apertured portion of the second electrode; and

said second electrode portion having a central aperture dimensioned and arranged with respect to the central aperture in the first electrode for producing therebetween a localized electron field lens which effects passage of the central electron beam without deflection, and having first and second outer apertures, each being dimensioned and arranged eccentrically with respect to the corresponding aperture in the first electrode for producing therebetween a localized electron lens field which effects deflection of the respective electron beam, substantially in the area of the crossover, toward convergence with the inner electron beam at the screen.

4,890,033

LIGHT-EMITTING COMPOSITION AND FLUORESCENT LAMP

Keizi Ichinomiya; Kouichi Okada; Yuji Itsuki, and Kaname Tsuchikura, all of Anan, Japan, assignors to Nichia Kagaku Kogyo K.K., Tokushima, Japan

Filed Jun. 28, 1988, Ser. No. 212,581

Claims priority, application Japan, Jun. 29, 1987, 62-161565

Int. Cl.[4] H01J *61/44, 61/46*

U.S. Cl. 313—487 **8 Claims**

1. A light-emitting composition comprising:

a phosphor material; and

an inorganic white powder material selected from the group consisting of a light metal oxide, a composite oxide thereof, an oxyacid salt of a metal and a composite oxyacid salt thereof, said inorganic white powder having an average spectral reflectance value in a wavelength range of ultraviolet to infrared rays of not less than 90% when the values of a spectral reflectance of a smoked magnesium oxide film are given as 100% at all wavelengths within that range, said inorganic white powder material being doped with not more than 5% by weight of at least one dopant selected from the group consisting of titanium, cerium, cadmium, cesium, antimony, potassium, scandium, zirconium, germanium, aluminum, lutetium, lanthanum, gadolinium, terbium, boron, and silicon, said inorganic white powder material being contained in an amount of 10 to 230% by weight based on the weight of said phosphor material.

4,890,034

THYRATRONS

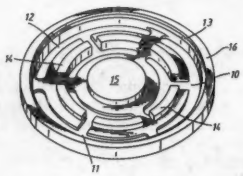
Hugh Menown, Chelmsford; Robert E. Baker, Southminster, and Leonard R. Cullum, Chelmsford, all of United Kingdom, assignors to English Electric Valve Company Limited, Chelmsford, England

Filed Jun. 18, 1987, Ser. No. 63,421

Claims priority, application United Kingdom, Jun. 21, 1986, 8615207

Int. Cl.[4] H01J *17/12*

U.S. Cl. 313—595 **9 Claims**



7. A thyratron including a cathode, an anode, and a grid disposed between the cathode and the anode, said grid comprising a body having a disk having a first aperture therein and a base portion arranged together with said disk; said first aperture having a first arcuate slot which is generally concentrically disposed about a first center point, a second arcuate slot which is generally concentrically disposed relative to the first center point, and a third slot disposed generally radially relative to the first center point and connecting said first and second arcuate slots; said base portion having a second aperture therein in communication with said first aperture, said second aperture having a first arcuate slot which is generally concentrically disposed about a second center point, a second arcuate slot which is generally concentrically disposed relative to the second center point, and a third slot disposed generally radially relative to the second center point and connecting said first and second arcuate slots; said first aperture and said second aperture being relatively disposed such that there is no direct line-of-sight between said anode and said cathode which passes through both said first and second apertures.

4,890,035

DISCHARGE ELECTRODE WITH MICROSTRUCTURE SURFACE

Franz Prein, Neckargemund; Jurgen Wiegand, Eppelheim; Peter Frey, and Norbert Klink, both of Pforzheim, all of Fed. Rep. of Germany, assignors to Eltro GmbH and Doduco KG, both of, Fed. Rep. of Germany

Continuation of Ser. No. 121,469, Nov. 17, 1987, abandoned. This application Apr. 4, 1989, Ser. No. 333,795

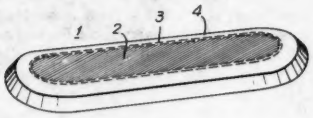
Claims priority, application Fed. Rep. of Germany, Nov. 18, 1986, 3639384; Dec. 15, 1986, 3642749

Int. Cl.[4] H01J *61/06*

U.S. Cl. 313—633 **19 Claims**

1. An electrode for electrical discharge, especially in a gas, said electrode comprising a first portion made of a first material doped with a second material and a second portion made of said first material not doped with said second material, said first and second materials having different physical properties

and said first portion having a surface for field emission, wherein said surface has a microstructure with a grain size



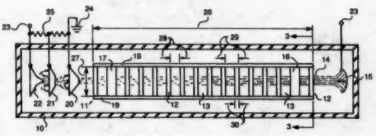
range from 0.1 to 100 microns and a geometry which increases the field emission.

4,890,036

MINIATURE TRAVELING WAVE TUBE AND METHOD OF MAKING

Henry G. Kosmahl, Olmsted Falls, Ohio, assignor to The United States of America as represented by the United States National Aeronautics and Space Administration, Washington, D.C.

Filed Dec. 8, 1987, Ser. No. 130,058
Int. Cl.[4] H01J *25/34*
U.S. Cl. 315—3.5 **12 Claims**



1. A miniature traveling wave tube (TWT) having a slow wave circuit (SWS) utilizing an electron beam, the SWS comprising:

an elongated base member having an input port and an output port, said ports being at opposite ends of said base member;

a plurality of parallel rectangular fins extending in the same direction from said base member, each of said fins having an aperture, the apertures all being aligned on an axis parallel to said base member for passage of the electron beam through the aperatures, the center of each aperture being positioned a measured distance from a top surface of said base member, said measured distance being between 0.7 and 0.9 times the distance from said top surface of the base member to a top edge of each respective fin, the alignment of the apertures being established by a drilled passageway in a block of material from which the base and fins are formed;

an elongated top cover disposed adjacent to top edges of said fins and opposite said base member;

an electrically insulating layer selected from the group of dielectric materials consisting of diamond, aluminum oxide, boron nitride, quartz and polytetrafluoroethylene disposed between said top cover and said fins, said electrically insulating layer being in contact with said fins and said top cover and comprising at least two strips of the dielectric material extending perpendicular to the rectangular fins and separated sufficiently to avoid interaction with the electron beam;

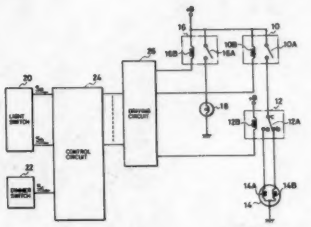
and wherein said electricaliy insulating layer has been disposed on the top cover by vapor deposition, electrodeposition, sputtering or ion beam deposition.

4,890,037

APPARATUS FOR CONTROLLING A VEHICLE HEADLAMP

Minoru Izawa; Tadanao Hamamoto; Masaru Ishikawa; Harumi Dohke, and Tasuku Nakano, all of Aichi, Japan, assignors to Toyota Jidosha Kabushiki Kaisha and Kabushiki Kaisha Tokai Rika Denki Seisakusho, both of Aichi, Japan

Continuation-in-part of Ser. No. 945,548, Dec. 23, 1986, abandoned. This application Dec. 5, 1988, Ser. No. 281,895
Claims priority, application Japan, Dec. 23, 1985, 60-198188
Int. Cl.[4] B60Q *1/02*
U.S. Cl. 315—77 **7 Claims**



1. An apparatus for controlling the lighting direction of a vehicle headlamp which emits light in either a low beam direction or a high beam direction, and for controlling a plurality of small lamps, comprising:

lamp switching means having an ON, an INTERMEDIATE, and an OFF position for providing a light-headlamp signal and light-small lamp signal as outputs when said headlamp switching means is in said ON position, and for providing a light-small lamp signal when said headlamp switching means is in said INTERMEDIATE position;

dimmer switching means having an ON position and an OFF position into which said dimmer switching means can be placed, for providing a change-direction signal as an output when said dimmer switching means is placed in said ON position;

lamp control means, operatively connected to said lamp switching means outputs and said dimmer switching means output for providing activate-low beam control signals in response to receipt of said light-headlamp signal, for providing an activate-small lamp control signal in response to receipt of said light-small lamp signal, and for providing an activate-change control signal in response to receipt of said change-direction signal; a microprocessor for providing said activate-low beam control signals, said activate-small lamp control signal, and said activate-change control signal in response to receipt of said light-head lamp signal, said light-small lamp signal and said change-direction signal, respectively;

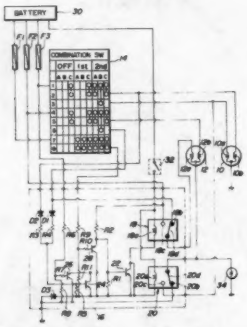
a driver, interposed between said microprocessor and said relays for transferring said activate-low beam control signals, said activate-small lamp control signal, and said activate-change control signal from said microprocessor to said relays; and

relay means, interposed between said lamp control means and said vehicle headlamp, and between said lamp control means and said small lamps, for turning ON said vehicle headlamp in said low beam direction in response to receipt of said activate-low beam control signal regardless of a last position of said dimmer switching means when said vehicle headlamp was OFF, for turning ON said small lamps in response to receipt of said activate-small lamp control signal, and for changing said lighting direction of said headlamp in response to said activate-change control signal only after said headlamp has been turned ON in said low beam direction.

4,890,038
POWER SUPPLY CIRCUIT FOR AUTOMOTIVE HEADLAMP WITH COMBINATIONAL SWITCH

Tomotaka Kurozu, Tokyo, Japan, and Sachiro Kataoka, Ann Arbor, Mich., assignors to Nissan Motor Co., Ltd., Japan

Filed Jan. 21, 1988, Ser. No. 146,403
Claims priority, application Japan, Jul. 22, 1987, 62-13126
Int. Cl.[4] B60Q *1/02*
U.S. Cl. 315—82 16 Claims



1. A power supply circuit for an automotive headlamp system including first and second headlamps comprising:

a power source for supplying electrical power to each of first and second headlamps via first and second fuses;

a switch assembly selectively operable between a plurality of switch positions including a first position for supplying a first magnitude electric current to the first and second headlamps through one of the first and second fuses for dimmer lighting, and a second position for supplying a second magnitude electric current greater than the first magnitude to the first headlamp through the first fuse and to the second headlamp through the second fuse; and

a current control circuit interposed between said power source and the first and second headlamps for controlling the current to be supplied to the first and second headlamps in response to the position of said switch assembly, said current control circuit including first circuit means for establishing a series circuit including said power source and the first and second headlamps for supplying the first magnitude electric current through one of the first and second fuses via said current control circuit when said switch assembly is in the first position, said first circuit means blocking communication between said power source and the first and second headlamps in series when either of the first and second fuses is open and second circuit means for connecting each of the first and second headlamps to said power source in parallel through the first and second fuses, respectively.

4,890,039
FLUORESCENT LAMP RESONANT BALLAST

Ole K. Nilssen, Caesar Dr., Barrington, Ill. 60010

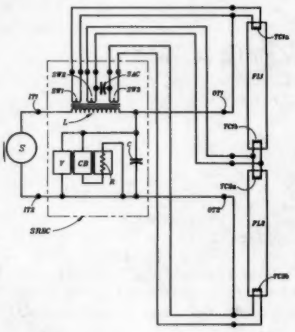
Continuation of Ser. No. 530,943, Sep. 12, 1983, abandoned. This application Nov. 21, 1988, Ser. No. 273,677
Int. Cl.[4] H05B *37/00*
U.S. Cl. 315—119 24 Claims

1. A ballast for a gas discharge lamp, said ballast being adapted to permit operation from a source of non-removable AC voltage and comprising:

a pair of input terminals operable to connect with said source of AC voltage;

a series-circuit of an inductor and a capacitor, said series-circuit being: (i) connected across said pair of input terminals, (ii) naturally resonant at or near the fundamental frequency of said AC voltage, and (iii) disposed to series-resonant action whenever said AC voltage is present across said input terminals;

connect means operable to permit said gas discharge lamp to be connected in parallel-circuit either with said capacitor or with said inductor; whereby, whenever the lamp is thusly connected and operating, said series-circuit is provided with a proper load; and



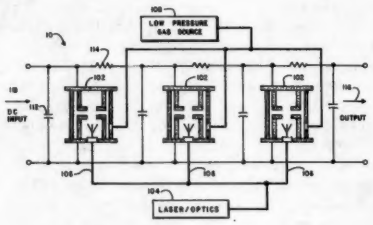
cut-out means connected in circuit with said series-circuit and operative to prevent said series-resonant action from taking place whenever the lamp is not connected or otherwise fails to provide said proper load;

the AC voltage being provided across the input terminals even while the cut-out means is performing its preventive function.

4,890,040
OPTICALLY TRIGGERED BACK-LIGHTED THYRATRON NETWORK

Martin A. Gundersen, 6828 N. La Presa Ave., San Gabriel, Calif. 91775

Filed Jun. 1, 1987, Ser. No. 56,587
Int. Cl.[4] H05B *41/36*
U.S. Cl. 315—155 13 Claims



1. A switch network comprising:

output means for providing an output;

power supply means for providing power;

pulse-forming network means for storing power supplied by said power supply means, said pulse-forming means being electrically coupled to said power supply means;

plural light-initiated glow discharge switches electrically coupled to each other, to said pulse forming means and to said output means; and

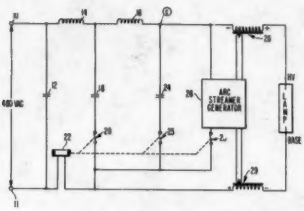
a light source optically coupled to said switches so that when said light source is activated said switches close to transfer power from said pulse-forming network means to said output means.

4,890,041

HIGH WATTAGE HID LAMP CIRCUIT

Joe A. Nuckolls, Blacksburg, Va., and Paul E. Payne, Vero Beach, Fla., assignors to Hubbell Incorporated, Orange, Conn.

Filed Mar. 10, 1988, Ser. No. 166,494
Int. Cl.[4] H05B *37/00, 39/00*
U.S. Cl. 315—225 13 Claims



1. A lamp start, hot restart and operating circuit comprising the combination of

a socket for receiving a high intensity discharge lamp;

a source of AC power;

first and second cascaded resonant circuits connected between said source and said lamp for forming an arc-forming discharge current for said lamp, each of said resonant circuits including a series-connected inductive reactor;

pulse circuit means coupled to said resonant circuits and to said lamp for producing a streamer-forming pulse discharge current for said lamp, said pulse circuit means including first and second pulse transformers having their secondary windings connected in series-aiding relationship and connected in series with said lamp; and

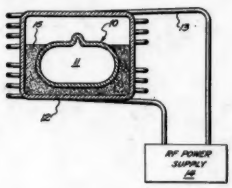
deactivating circuit means responsive to lamp operating current for deactivating said pulse circuit means and said resonant circuits so that said reactors function as a ballast for said lamp during normal operation.

4,890,042

HIGH EFFICACY ELECTRODELESS HIGH INTENSITY DISCHARGE LAMP EXHIBITING EASY STARTING

Harald L. Witting, Burnt Hills, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jun. 3, 1988, Ser. No. 202,737
Int. Cl.[4] H05B *41/16*
U.S. Cl. 315—248 14 Claims



1. A mercury-free electrodeless metal halide arc lamp comprising:

a light transmissive arc tube for containing an arc discharge;

a fill disposed in said arc tube to generate said arc discharge, said fill including sodium iodide and a gas selected from the group consisting of krypton and argon in a quantity sufficient to provide a partial pressure in the range of about 100-500 torr at room temperature so as to limit the transport of thermal energy from said arc discharge to the walls of said arc tube; said fill further comprises cerium halide, said halide being selected from the group consisting of chlorides and iodides, said sodium iodide and said cerium halide being present in weight proportions to generate white color lamp emission, wherein the weight proportion of cerium halide is not greater than the weight proportion of sodium iodide and

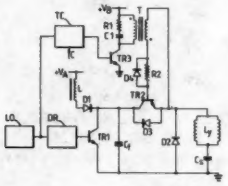
excitation means for coupling radio-frequency energy to said fill.

4,890,043

ARRANGEMENT FOR GENERATING A SAWTOOTH CURRENT

Alan J. Davie, Orpington, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 2, 1988, Ser. No. 266,182
Claims priority, application United Kingdom, Dec. 18, 1987, 8729516
Int. Cl.[4] H01J *29/70, 29/76*
U.S. Cl. 315—408 5 Claims



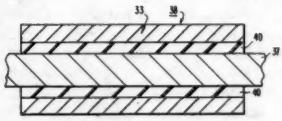
1. An arrangement for generating a sawtooth current having a stroke period and a flyback period through an inductive load, said arrangement comprising said inductive load, a storage capacitor, a unidirectional device through which said sawtooth current flows during a first part of each stroke period, a controlled switch through which said sawtooth current flows during a second part of each stroke period, a flyback capacitor connected in parallel with a main current path of said controlled switch, and a pulse source for supplying a pulse train for controlling the switching of said controlled switch, characterized in that said arrangement additionally comprises switch means by which the flyback capacitor can be electrically isolated periodically from the inductive load and the storage capacitor when the voltage across the flyback capacitor has reached its peak value and for re-connecting the flyback capacitor thereto after a finite period for extending the flyback period.

4,890,044

HIGH FREQUENCY SIGNAL SUPPRESSION COMPONENT

Randall C. Clayburn, Indianapolis, Ind., assignor to RCA Licensing Corporation, Princeton, N.J.

Continuation of Ser. No. 880,225, Jun. 30, 1986, abandoned.
This application Mar. 28, 1988, Ser. No. 175,644
Int. Cl.[4] H01J *29/70;* H01P *1/18;* H03H *7/00*
U.S. Cl. 315—411 9 Claims



1. In a circuit having a conductor that generates undesired signal energy of a high frequency when current flows therein, a high frequency signal energy absorption arrangement comprising:

a bead-like member having a longitudinal passage that defines an inner wall and that receives said conductor there-

through, said passage being wide enough to permit movement of said bead-like member on said conductor, said member formed from a material that is magnetically permeable for absorbing enough high frequency signal energy to subject said member to vibrating motion to make said bead-like member susceptible to audible vibration against said conductor; and

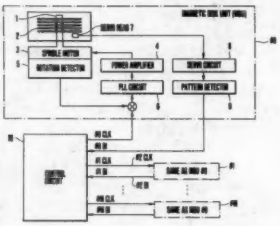
an elastic nonpermeable material not subject to said vibrating motion and capable of damping said vibrating motion, said elastic material being disposed within said passage to form an elastic layer beteen said conductor and said inner wall of said member to permit relative movement between said member and said conductor in a resilient manner that substantially prevents audible vibration of said member against said conductor.

4,890,045

SPINDLE MOTOR CONTROL SYSTEM FOR MAGNETIC DISK APPARATUS

Hiromi Ishizuka, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Dec. 28, 1988, Ser. No. 292,602
Claims priority, application Japan, Dec. 28, 1987, 62-335963
Int. Cl.[4] G05B *1/02*
U.S. Cl. 318—608 **4 Claims**



1. A spindle motor control system for a magnetic disk apparatus comprising a magnetic disk unit which outputs an index signal upon rotation of a spindle motor therein and inputs a control signal for controlling a rotation of the spindle motor by the control signal, and control means for inputting the index signal from said magnetic disk unit to output the control signal to said magnetic disk unit, said control means comprising

means for generating a master clock signal of a predetermined frequency;

means for frequency-dividing the master clock signal to generate a plurality of frequency-divided signals;

means for generating a master index signal upon each rotation of said spindle motor by frequency dividing one of the plurality of frequency-divided signals;

detector means for detecting a time interval between the master index signal and the index signal to output a phase control signal and a select signal;

selector means for selecting and outputting one of the plurality of frequency-divided signals from said frequency-dividing means in accordance with the select signal;

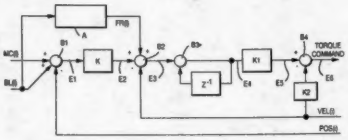
means for masking the master clock signal for a time period in accordance with the phase control signal, the master index signal, and an output signal of said selector means to output the control signal to said magnetic disk unit.

4,890,046

NUMERICAL CONTROL APPARATUS

Mitsuo Kurakake, Hino, and Keiji Sakamoto, Hachioji, both of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan

PCT No. PCT/JP87/00967, § 371 Date Jul. 29, 1988, § 102(e) Date Jul. 29, 1988, PCT Pub. No. WO88/04445, PCT Pub. Date Jun. 16, 1988
PCT Filed Dec. 11, 1987, Ser. No. 231,853
Claims priority, application Japan, Dec. 12, 1986, 61-296387
Int. Cl.[4] G05B *11/01*
U.S. Cl. 318—630 **2 Claims**



1. A numerical control apparatus for controlling a semi-closed loop servo-control system which controls a servomotor by forming a position command by a move command and a backlash correction command for backlash at a mechanical load, comprising:

discriminating means for discriminating, on the basis of the backlash correction command, a quadrant position prevailing when the direction of rotation of the servomotor reverses;

correcting means for forming a torque correction signal corresponding to frictional resistance of the mechanical load; and

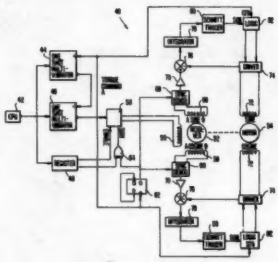
arithmetic means for computing a velocity command decided from said position command by the torque correction signal.

4,890,047

DIGITAL PULSE WIDTH MODULATION CONTROL OF BRUSHLESS DC MOTORS

John J. Maney, Palm Bay, Fla., assignor to Harris Corporation, Melbourne, Fla.

Filed Jun. 25, 1986, Ser. No. 878,257
Int. Cl.[4] G05B *1/06*
U.S. Cl. 318—661 **14 Claims**



1. A torque controller for a brushless DC motor having an armature which is rotatably driven by at least one pair of armature windings and a resolver driven by the armature which functions in the sensing of the rotational position of the armature by the application of a time varying electrical signal A to a resolver excitation winding which is picked up by first and second sensing windings which respectively produce signals equal to Asine θ and Acosine θ wherein θ is the angular position of the armature and resolver comprising:

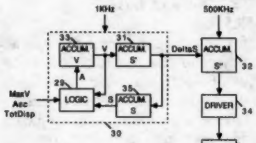
(a) means for applying a variable torque command A to said resolver excitation winding for controlling the torque produced by said armature;
(b) means for detecting the time varying signal Asine θ picked up by said first sensing winding;
(c) means for detecting the time varying signal Acosine θ picked up by said second sensing winding; and
(d) means for controlling the at least one pair of armature windings as a function of the torque command A.

4,890,048

LOW TORQUE RIPPLE STEPPING MOTOR CONTROLLER CIRCUIT

L. Wayne Hunter, 15075 NW. Pioneer Rd., Beaverton, Oreg. 97006

Filed Jan. 9, 1989, Ser. No. 295,591
Int. Cl.[4] H02P *8/00*
U.S. Cl. 318—696 **12 Claims**



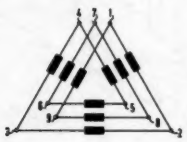
1. An apparatus responsive to high and low frequency clock signals for generating an output signal having a frequency changing linearly with time, the apparatus comprising:
means for periodically adjusting an output value in response to each cycle of said low frequency clock signal such that said output value has a rate of change oscillating about a predetermined constant value; and
an accumulator for successively incrementing an accumulated value by an amount in accordance with the output value of said means in response to successive cycles of said high frequency clock signal, said accumulated value overflowing upon reaching a predetermined limit, said accumulator asserting a pulse of said output signal upon overflow of the accumulated value.

4,890,049

CIRCUIT AND WINDING ARRANGEMENT FOR A MULTIPHASE ELECTRIC ROTATING FIELD MACHINE

Herbert Auinger, Nuremberg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jul. 13, 1988, Ser. No. 218,703
Claims priority, application Fed. Rep. of Germany, Jul. 23, 1987, 3724441; Apr. 27, 1988, 3814244
Int. Cl.[4] H02P *1/32*
U.S. Cl. 318—771 **12 Claims**



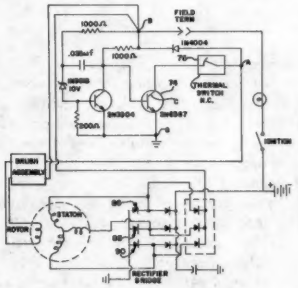
1. A circuit and winding arrangement for starting up a three-phase rotating-field machine, especially an induction motor having a squirrel cage winding and a stator winding, wherein the stator winding of the machine is subdivided for each phase into three winding branches and is switchable to at least three different operating stages for increasing the impedance of the machine during the starting up process, the first and second winding branches of each phase being joined permanently into a self-contained winding train, whereby six connection points are formed by common connection points of two respective winding branches, and wherein three selected connection points of the first and second winding branches are connected in delta formation during an operating starting up stage and three further connection points during a further starting up stage are connected in a double delta formation, and wherein during a normal operating stage the third winding branches are connected in delta formation.

4,890,050

AUTOMOTIVE ALTERNATOR

Daniel A. Mackevich, Chicago, Ill., assignor to Vanguard Products Corporation, Hillside, Ill.

Filed Oct. 6, 1987, Ser. No. 105,095
Int. Cl.[4] H02P *9/30*
U.S. Cl. 322—34 **3 Claims**



1. A high wattage automotive alternative adapted to be mounted on an engine and in an engine compartment of an automotive vehicle, said alternator comprising:
(A) a housing having a partially perforated rear wall, a front wall providing ventilation openings therethrough and an imperforate, circumferential, intermediate wall extending between the front and rear walls;
(B) a stator assembly including stator windings and mounted in said housing;
(C) a rotor assembly including a rotor winding and mounted in said housing concentrically of said stator assembly;
(D) said stator and rotor assemblies, said rear wall and said intermediate wall substantially closing off a part of the inside of said housing to form a rear chamber in said housing; said stator and rotor assemblies producing heat that becomes trapped in said rear chamber;
(E) a diode assembly including a heat sink and plural diodes mounted on said heat sink, said diodes being connected to said stator windings to rectify electrical power produced in said stator assembly to DC power; and
(F) a regulator connected electrically to said diode assembly and said windings of said stator and rotor to regulate the current produced in said stator windings, said regulator including a power transistor for controlling the current being applied to said winding of said rotor to produce said current in said stator, said power transistor including a heat sink tab extending therefrom and said regulator further including a temperature sensor mounted on said heat sink tab, said regulator being mounted on said rear wall in aid rear chamber of said housing and said temperature sensor substantially being exposed to heat to which said diodes and power transistor are exposed to open a connection with said power transistor upon said temperature sensor sensing an over temperature condition.

4,890,051

CMOS INPUT BUFFER STABLE FOR THE VARIATION OF A POWER SUPPLYING VOLTAGE

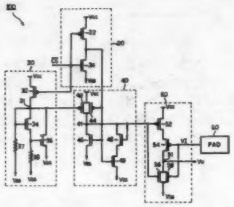
Byung-Youn Kim, Seoul; Yong-Bo Park, Busan, and Tae-Sung Jung, Kyounggi-do, all of Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suwon City, Rep. of Korea

Filed Dec. 27, 1988, Ser. No. 289,731

Claims priority, application Rep. of Korea, Dec. 20, 1988, 198817051[U]

Int. Cl.[4] G05F *3/24*

U.S. Cl. 323—313 14 Claims



1. A CMOS input buffer, comprising:

means for generating a constant reference voltage;

means for supplying a first voltage approximately proportional to the difference between said reference voltage and a power supply voltage within a fixed range of said power supply voltage;

a first P-channel MOS transistor for supplying a constant current upon variation of said power supply voltage, said first P-channel MOS transistor having a gate connected with said first voltage, a source connected with said power supply voltage, and a drain;

a second P-channel MOS transistor having a source connected with the drain of said first P-channel MOS transistor, a gate connected with an input signal, and a drain connected with an output terminal; and

a first N-channel MOS transistor having a drain connected with the drain of said second P-channel MOS transistor, a gate connected with said input signal, and a source connected with a reference potential voltage.

4,890,052

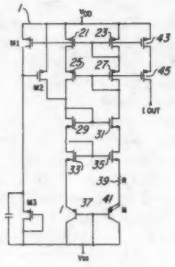
TEMPERATURE CONSTANT CURRENT REFERENCE

James R. Hellums, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 4, 1988, Ser. No. 228,352

Int. Cl.[4] G05F *3/20*

U.S. Cl. 323—315 14 Claims



1. A temperature constant Gm current reference circuit comprising:

(a) a unidirectionally conducting semiconductor device coupled to a reference voltage source;

(b) a branch circuit comprising a polysilicon resistor having a negative temperature coefficient of resistance and having a predetermined doping level and a plurality of parallel connected unidirectional current carrying elements serially connected to said resistor, said branch circuit being coupled at one end thereof to said reference voltage source; and

(c) means to apply a substantially identical voltage across each said semiconductor device and said branch circuit.

4,890,053

METHOD AND APPARATUS FOR DETECTING A MISSING OBJECT IN A SET OF OBJECTS

Joseph L. Banyasz; Aubrey T. Burton; Bernard C. LaRoy, and David A. Lowitz, all of Richmond, Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed Apr. 15, 1988, Ser. No. 182,171

Int. Cl.[4] G01R *27/04*

U.S. Cl. 324—58.5 A 20 Claims

1. A method for detecting the absence, from a set of objects, of at least one object in said set, said objects being less than fully transmissive of electromagnetic radiation in a given frequency range outside the optical frequency range and being at least partially reflective in said given frequency range, said objects being enclosed in a container that is substantially opaque in the optical frequency range but is at least partially transmissive in said given frequency range, said method comprising the steps of:

generating a monochromatic beam of electromagnetic radiation in said given frequency range, said beam propagating in a propagation direction;

shaping said beam to provide an effective shape and cross-sectional area predetermined for said set of objects;

transporting said set of articles along a transport path normal to said propagation direction of said shaped beam, whereby said objects prevent transmission of at least some of said shaped beam; and

detecting radiation transmitted through said set of objects.

4,890,054

APPARATUS AND METHOD FOR MEASURING PHYSICAL QUANTITIES

Yorihiko Maeno, and Shigeyasu Higashi, both of Tokyo, Japan, assignors to Dipole Electronics Co., Ltd., Tokyo, Japan

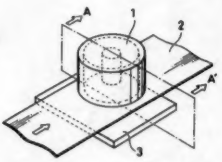
PCT No. PCT/JP87/00950, § 371 Date Jul. 15, 1988, § 102(e) Date Jul. 15, 1988, PCT Pub. No. WO88/04423, PCT Pub. Date Jun. 16, 1988

PCT Filed Dec. 8, 1987, Ser. No. 243,336

Claims priority, application Japan, Dec. 9, 1986, 61-293026

Int. Cl.[4] G01N *22/00*

U.S. Cl. 324—58.5 A 20 Claims



1. An apparatus for measuring physical quantities of a sheet object, comprising:

a substantially cylindrical cavity electrode having a single means for both emitting and receiving microwave energy, said electrode including a cylindrical portion which is closed at one end and open at the other end, said opening being at a position facing said sheet object to be measured,

and a substantially cylindrical protrusion at a substantially central portion of said electrode, said protrusion having a top or end surface facing an area of said sheet object to be measured, said top or end surface being substantially parallel to said sheet object so that electric fields become dense on the area of said sheet object to be measured; and

a plate electrode larger than the opening of said substantially cylindrical electrode, and spaced apart from said opening to thereby provide a gap for insertion of said sheet object between said substantially cylindrical electrode and said plate electrode;

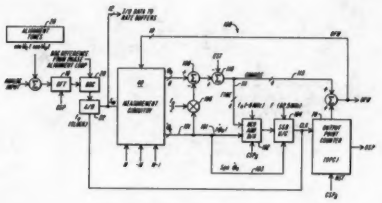
said microwave emitting and receiving means emitting microwave energy into said substantially cylindrical electrode, and receiving microwave energy reflected by an inside wall of said substantially cylindrical electrode, said received microwave energy being attenuated and shifted in frequency at a resonance condition of said substantially cylindrical and plate electrodes when said sheet object is inserted within said gap.

4,890,055

COMPENSATED CHIRP FOURIER TRANSFORMER

Paul Van Broekhoven, Needham, and Walter J. Guinon, Newburyport, both of Mass., assignors to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.

Filed Oct. 28, 1988, Ser. No. 264,447
Int. Cl.[4] G01R *23/16*
U.S. Cl. 324—77 B **18 Claims**



1. An improved chirp Fourier transformer circuit of the type wherein a broadband time varying input signal is passed through a first dispersive circuit element, is mixed with a chirp signal and is passed through a second circuit element to produce an output signal representative of the frequency domain transform of said input signal, said output signal being sampled at a plurality of sampling intervals to determine successive frequency band components of said input signal, wherein the improvement comprises

alignment tone means for injecting known tones into said first dispersive circuit element thereby developing transformed output alignment signals corresponding thereto,

measurement means for measuring said output alignment signals to develop measurements thereof, and

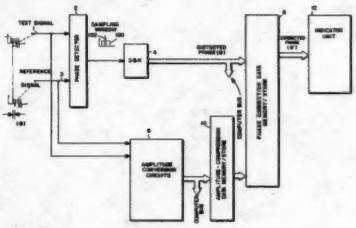
output correction means responsive to said measurements for shifting said sampling intervals such that a defined sampling interval corresponds to a fixed input tone, thereby correcting output signal drift.

4,890,056

METHOD AND APPARATUS FOR ERROR CORRECTION OF PHASE MEASUREMENT SIGNALS

Jens Peters, and Ludwig Becker, both of Hamburg, Fed. Rep. of Germany, assignors to Deutsches Electronen-Synchrotron DESY, Hamburg, Fed. Rep. of Germany

Filed Jan. 10, 1989, Ser. No. 295,340
Claims priority, application Fed. Rep. of Germany, Jan. 16, 1988, 3801154
Int. Cl.[4] G01R *25/00*
U.S. Cl. 324—83 D **20 Claims**



1. Apparatus for accurately measuring the phase difference between two alternating current input signals, said apparatus comprising:

phase difference measuring means for receiving said input signals and for producing a first signal as a function of the phase difference therebetween but also including predetermined distortion components related (a) to the amplitude of at least one of the input signals and (b) to the phase difference itself;

amplitude measuring means for producing a second signal as a function of the amplitude of at least one of the input signals; and

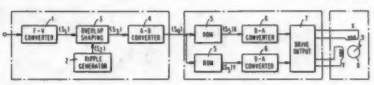
correction means for outputting a corrected phase difference signal as a function of said first and second signals which corrected phase difference signal is compensated for said distortion components and thereby more accurately represents the true phase difference between said input signals.

4,890,057

INSTRUMENT WITH CROSSED-COIL TYPE MOVABLE MAGNET

Hisataka Kobayashi; Fujio Araki, and Yoshihiro Ohtani, all of Niigata, Japan, assignors to Nippon Seiki Co., Ltd., Niigata, Japan

Filed Jun. 28, 1988, Ser. No. 213,101
Claims priority, application Japan, Aug. 31, 1987, 62-217323
Int. Cl.[4] G01R *5/06*
U.S. Cl. 324—140 D **6 Claims**



1. A crossed-coil indicator system for displaying an analog electrical quantity, comprising:

input means for receiving an analog electrical signal;

ripple generator means for adding an a.c. signal having a predetermined frequency to said analog signal received at said input means to generate a ripple modulated signal;

A-D converter means receiving said ripple modulated signal and supplying a digital output signal in response thereto;

indicator driver means receiving said digital output signal and, in response thereto, generating first and second analog drive signals; and

a cross-coil type indicator including a pair of orthogonally wound crossed coils receiving said first and second analog drive signals, respectively.

4,890,058

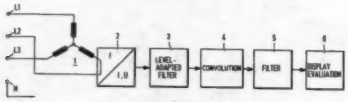
ARRANGEMENT FOR MEASURING THE SLIP OF ELECTRIC INDUCTION MOTORS

Gerhard Trenkler, Brunswick; Reinhard Wedekind, Hamburg, and Reinhard Maier, Herzogenaurach, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 3, 1987, Ser. No. 252,761

Int. Cl.[4] G01R *31/02*

U.S. Cl. 324—158 MG **6 Claims**



1. An arrangement for measuring the slip of an electric induction motor having at least one phase, comprising: a level-adapted preliminary filter stage coupled to said motor so as to be supplied at least one of current signals and /or voltage signals generated by said motor, said current and/or voltage signals having a frequency proportional to the slip; means for signal convolution in a frequency range at at least one of a power supply frequency and/or its harmonics, said means for signal convolution being coupled to an output of said level-adapted preliminary filter stage; a filter coupled to an output of said means for signal convolution and at least one of a display unit and/or an evaluating unit coupled to an output of said filter.

4,890,059

DIGITAL TACHOMETER WITH AIR GAP ADJUSTING YOKE INSERTABLE THROUGH HOLES IN THE TACHOMETER HOUSING

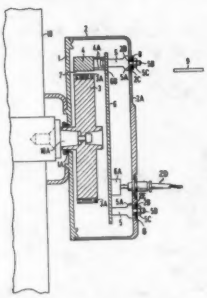
Herwig Guentner, Schwabach, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Oct. 11, 1988, Ser. No. 255,978

Claims priority, application Fed. Rep. of Germany, Oct. 23, 1987, 8714182[U]

Int. Cl.[4] G01P *3/487;* **G01R** *1/04;* **H05K** *7/00*

U.S. Cl. 324—174 **4 Claims**



1. A digital tachometer adapted to be mounted on a shaft projecting from a machine housing comprising:

(a) a generator wheel, having an axis, a circumference and a plurality of set and reset magnets distributed about the circumference, adapted to be coupled to a machine shaft;

(b) a housing having a lower part adapted to be fastened to a machine housing from which the machine shaft projects and an upper part enclosing said generator wheel, said upper part having a planar front surface perpendicular to the axis of said generator wheel;

(c) a structural unit comprising:

i. a stiff circuit board;

ii. a sensor cassette containing therein one or more wire pulse sensors, said sensor cassette extending over a part of the generator wheel circumference such that the wire pulse sensors therein are spaced from the circumference of said generator wheel by an air gap; and

iii. means for electrically connecting and mechanically coupling said sensor cassette to said stiff circuit board;

(d) means for mounting said structural unit to the planar front surface of said upper part within said housing such as to be adjustable in a plane parallel to said planar front surface;

(e) two adjusting holes in said stiff circuit board, at the location of the air gap between said sensor cassette and said generator wheel, and two corresponding holes in said planar front surface of said upper part, whereby two legs of an adjusting yoke can be inserted through the holes in said planar front surface and the holes in said stiff circuit board to accurately establish a uniform air gap, whereupon said structural unit can be fixed relative to said planar front surface and said yoke then removed.

4,890,060

ELECTROMECHANICAL ABUTMENT SENSOR WITH RESILIENT DAMPER PLATE FOR SENSING SHEETS IN A SHEET FOLDING MACHINE

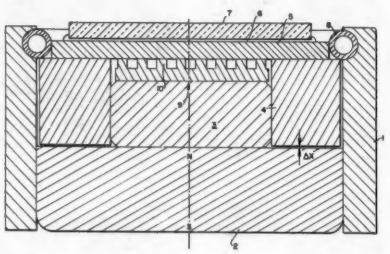
Wolf Kuhn, Nuremberg, Fed. Rep. of Germany, assignor to Maschinebau Oppenweiler Binder GmbH & Co., Fed. Rep. of Germany

Continuation of Ser. No. 840,412, Mar. 14, 1986, abandoned. This application Apr. 22, 1988, Ser. No. 185,146

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1985, 2509412

Int. Cl.[4] B65H *45/04;* **G01R** *33/12;* **H02K** *35/04;* **H01F** *7/08*

U.S. Cl. 324—239 **11 Claims**



1. An electromechanical abutment sensor for sheet folding machines for signalling when a sheet is in position for folding comprising

a magnet,

a cylinder **3** seated on the magnet,

a damper plate seated on the cylinder **3**,

a coil having a carrier plate mounted at one end with the carrier plate seated on the damper plate and the coil surrounding the cylinder **3** and with the other end of the coil separated from the magnet by a space,

the damper plate being resilient to permit movement of the coil towards the magnet when the damper plate is compressed due to a striking sheet pushing the carrier plate against the damper plate and to permit return of the coil to its original position when the force of the striking sheet is abated,

said damper plate having projections extending upwardly therefrom to receive the force of the striking sheet,

the relative movement of said magnet and coil towards each other producing varying electric voltages in the coil that may be tapped off as an electric signal to initiate the folding of the sheet.

4,890,061

MAGNETIC RESONANCE IMAGING APPARATUS

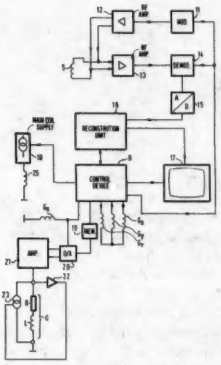
Johannes H. Den Boef, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 8, 1988, Ser. No. 241,633

Claims priority, application European Pat. Off., Sep. 18, 1987, 87201783.5

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—320 **5 Claims**



1. Magnetic resonance imaging apparatus comprising means for generating a homogeneous steady magnetic field in an examination area, a gradient coil system for generating dynamic gradient magnetic fields which extend i the direction of the steady magnetic field and which vary linearly spatially in three mutually perpendicular directions, an RF coil for generating an RF magnetic field perpendicular to the direction of the steady magnetic field, a shim coil system for providing a correcting magnetic field in the examination area in response to activating currents, a detecting coil for detecting signals indicative of dynamic inhomogenieties in the magnetic fields generated in the examination area and means for dynamically controlling the shim coil activating currents in dependence of the signals thus detected, whereby dynamic disturbances of the magnetic fields in the examination area due to gradient magnetic field induced eddy currents are mitigated.

4,890,062

AUTOMATIC IMPEDANCE ADJUSTER FOR MRI SYSTEM

Motoji Haragashira, Nishinasunomachi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Feb. 3, 1989, Ser. No. 305,935

Claims priority, application Japan, Feb. 8, 1988, 63-26788

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—322 **9 Claims**

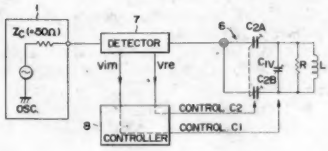
1. An automatic impedance adjuster for adjusting impedance of a probe head in an MRI (magnetic resonance imaging) system to be equal to a characteristic impedance, comprising:

an impedance adjusting element, provided to said probe head, for allowing variable adjustment of real and imaginary parts of an impedance of said probe head;

oscillator means, having a predetermined output impedance, for supplying a signal to said probe head;

detection means, connected between said probe head and said oscillator means, for outputting detection signals respectively corresponding to the real and imaginary parts of the impedance of said probe head based on the output from said oscillator means supplied to said probe head;

control means, responsive to the signals corresponding to the real and imaginary parts obtained from said detection means, for supplying to said impedance adjusting element of said probe head, a control signal for adjusting the real



and imaginary parts of the impedance of said probe head to coincide with a predetermined impedance, said control means including;

means for executing an initial routine for adjusting the impedance of said probe head so as to set the signal corresponding to the imaginary part to be zero; and

means for executing a matching routine for controlling the impedance of said probe head by using the value set in the initial routine as an initial value, and adjusting the impedance so as to set both the signals corresponding to the real and imaginary parts to be zero.

4,890,063

PROBE COIL SYSTEM FOR MAGNETIC RESONANCE APPARATUS

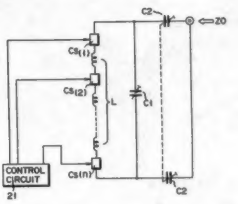
Motoji Haragashira, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 9, 1988, Ser. No. 230,195

Claims priority, application Japan, Aug. 10, 1987, 62-199622

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—322 **8 Claims**



1. A probe coil system for a magnetic resonance (MR) apparatus which includes a circuit including a coil, said MR apparatus performing at least one application of a radio frequency magnetic field for exciting MR in an object and detecting an MR signal generated from said object by said MR, said probe coil system comprising:

a plurality of coil elements constituting said coil;

a plurality of shortening capacitor elements inserted between and in series with said coil elements;

a first capacitor including a variable capacitor connected at least equivalently in parallel with a series circuit including said coil elements and said shortening capacitor elements; and

a second capacitor including variable capacitors connected

at least equivalently in series with and at both ends of said series circuit,

wherein each of said shortening capacitor elements comprises a plurality of capacitors and a plurality of switches, selectively opened and closed to switch a total capacitance of said plurality of capacitors and to allow selection of one of a plurality of resonance frequencies by adjusting said first and second capacitors within a predetermined range.

4,890,064

METAL DETECTOR SENSING HEAD WITH REDUCED EDDY CURRENT COILS

Bruce H. Candy, Adelaide, Australia, assignor to Minelab Electronic Industries Ltd., Adelaide, Australia

PCT No. PCT/AU86/00366, § 371 Date Jul. 27, 1987, § 102(e) Date Jul. 27, 1987, PCT Pub. No. WO87/03380, PCT Pub. Date Jun. 4, 1987

PCT Filed Nov. 26, 1986, Ser. No. 97,969

Claims priority, application Australia, Nov. 26, 1985, PH03573

Int. Cl.[4] **G01V** *3/08, 3/10;* **G01R** *33/00*

U.S. Cl. 324—329 **8 Claims**

1. A sensing head for a metal detector, comprising:

means for magnetic transmission of a signal to a target at a measuring frequency; and

means for magnetic detection of a retransmitted signal from said target,

wherein at least one of said magnetic transmission and magnetic detection means has a coil made of a conductor material in which at least some of the conductor material passes current therethrough and in which the respective total equivalent eddy current resistance of each coil is less than 0.015 ohms per kilohertz per coil at said measuring frequency, whereby the magnitude of eddy currents in said conductor material is restricted so as to provide ground balancing substantially independent of the distance between the ground and said sensing head.

4,890,065

RELATIVE TIME DELAY CORRECTION SYSTEM UTILIZING WINDOW OF ZERO CORRECTION

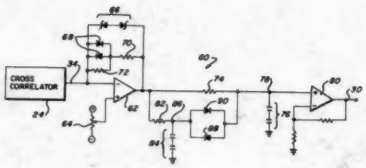
William H. Laletin, Boulder, Colo., assignor to Howe Technologies Corporation, Boulder, Colo.

Filed Mar. 26, 1987, Ser. No. 31,108

Int. Cl.[4] **H03K** *5/22, 5/00;* **G05F** *5/00;* **H03G** *00/00*

U.S. Cl. 328—155 **8 Claims**

1. A time delay corrector for receiving two input signals containing a relative time delay or phase error therebetween, correcting said time delay or phase error, producing two output signals corresponding to said two input signals and feeding said two output signals to output drive amplifiers, said corrector comprising signal propagation control means for receiving said two input signals and producing two correlated output signals corresponding thereto, sensing means operatively connected to said signals propagation control means for sensing said output signal and producing a phase error signal representative of a relative phase error between said output signals, and correcting means operatively connected to said sensing means for sensing said phase error signal and producing a phase error correction signal for controlling said signal propagation control means to correct a significant phase error between said two output signals without substantially degrading the information content of said two output signals while substantially ignoring the normal relative phase fluctuations which characterize the information content of said two input signals; characterized by the improvement in said correcting means comprising first means operative to receive said phase error signal from said sensing means for producing a first detection signal characteristic of relatively short time interval phase errors, second means operative to receive said phase error signal from said sensing means for producing a second detection signal characteristic of relatively long time interval phase errors, threshold means defining a first threshold detection signal level representative of a predetermined level of short time interval phase



errors and operatively connected to said first means for limiting said first means to production of a first detection signal representative of short time interval phase errors exceeding the first threshold detection signal level, and control means and operative in response to said first and second detection signals for producing a first phase error correction signal having a characteristic established primarily by th- characteristics of said first detection signal and a second phase error correction signal having a characteristic established primarily by the characteristics of said second detection signal in the absence of a first detection signal, said control means being operatively connected to said signal propagation control means whereby said second phase error correction signal causes said signal propagation control means to correct significant long time interval phase errors, and said first phase error correction signal causes said propagation control means to correct short time interval phase errors which are more significant than said predetermined level of short term phase errors.

4,890,066

ENVELOPE DETECTOR

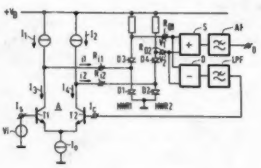
Willibrordus G. M. M. Straver, Nootdorp, and Ernst H. Nordholt, Berkel en Rodenrijs, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 29, 1988, Ser. No. 238,011

Claims priority, application Netherlands, Sep. 21, 1987, 8702246

Int. Cl.[4] **H03D** *1/18, 1/06;* **H03K** *9/02*

U.S. Cl. 329—369 **4 Claims**



1. An envelope detector comprising a differential amplifier, a full-wave rectifier circuit and a smoothing filter, said differ-

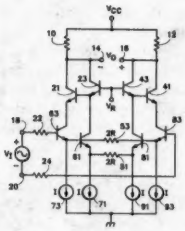
ential amplifier converting an input voltage into a pair of current signals in phase opposition, said full-wave rectifier circuit comprising a pair of half-wave rectifiers for half-wave rectifying the said pair of current signals and furnishing respective half-wave rectifier output signals corresponding to the so-rectified current signals, and a first combining stage coupled to said full-wave rectifier circuit for combining said half-wave rectifier output signals with like polarity, characterized by a frequency-dependent negative feedback loop which has a second combining stage coupled to the outputs of the pair of half-wave rectifiers for combining said half-wave rectifier output signals with opposite polarity, said second combining stage being negatively fed back to the differential amplifier via a low-pass filter for a selection of the d.c. component.

4,890,067

COMMON BASE CONFIGURATION FOR AN F_T DOUBLER AMPLIFIER

James S. Lamb, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Apr. 13, 1989, Ser. No. 337,677
Int. Cl.[4] H03F 3/45
U.S. Cl. 330—149 **6 Claims**



1. An f_T doubler amplifier comprising:

(a) an f_T doubler stage having an input for receiving a differential input voltage, a pair of inner collectors for providing a first differential current and a pair of outer collectors for providing a second differential current; and

(b) a Darlington common base stage having a pair of inner emitters for receiving the second differential current, a pair of outer emitters for receiving the first differential current, and an output for providing a differential output current.

4,890,068

OPEN-LOOP CURRENT AMPLIFIERS HAVING IMPROVED GAIN CHARACTERISTICS

Syed M. Ahmed, Flemington, N.J., assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

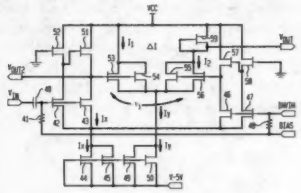
Filed Dec. 13, 1988, Ser. No. 283,674
Int. Cl.[4] H03F 3/45
U.S. Cl. 330—253 **20 Claims**

1. An improved wideband amplifier apparatus (FIG. 5) for exhibiting increased gain over a broad bandwidth comprising:

a first pair of FETS (53, 56) arranged in a differential amplifier configuration having source electrodes coupled together, and drain electrodes adapted to be coupled to a point of operating potential (vCC), and means (49, 50) coupled to said source electrodes of said first pair to provide a current return for said first pair, each FET in said first pair having a gate electrode,

a second pair of FETS (42, 43) having gate electrodes coupled together for receiving an input signal and source electrodes coupled together, with a first FET (42) in said second pair having a drain electrode coupled to the source electrode of a third FET (52) with the gate electrode of said third FET (52) coupled to a point of reference potential and with the drain electrode of said third FET (52) adapted to be coupled to said point of operating potential, with the drain electrode of a second FET (43) in said second pair coupled to the source electrode of a fourth FET (51) at a first junction, with the source electrode of said third FET (52) coupled to the gate electrode of said fourth FET (51) and with said first junction coupled to the gate electrode of a first FET (53) in said first pair, said first junction providing an output (VOUT 2),

a third pair of FETS (46, 47) having gate electrodes coupled together for receiving said input signal and source electrodes of said second pair of FETS (42,43) to form a differential amplifier configuration therewith and means (44, 45) coupled to said source electrodes of said second and third pairs to provide a current return for said second



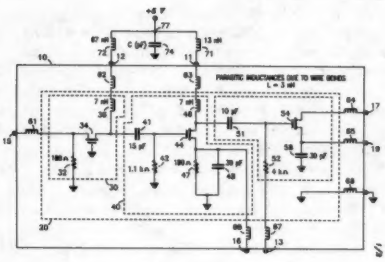
and third pairs, and with the drain electrode of a first FET (47) in said third pair coupled to the source electrode of a fifth FET (58) at a second junction, with the gate electrode of said fifth FET (58) coupled to a point of reference potential, and with the drain electrode of a second FET (46) in said third pair coupled to the source electrode of a sixth FET (57) at a third junction, the gate electrode of said sixth FET (57) being coupled to the second junction, with the drain electrodes of said fourth, fifth and sixth FETS (51, 57, 58) adapted to be coupled to said point of operating potential and with the third junction coupled to the gate electrode of a second FET (56) in said first pair, whereby upon receipt of said input signal, said amplifier provides a high gain output signal at the drain electrode of said second FET (43) of said second pair (VOUT 2).

4,890,069

GALLIUM ARSENIDE POWER MONOLITHIC MICROWAVE INTEGRATED CIRCUIT

Joseph M. Duffalo, Mesa, Ariz., and Steven C. Lazar, Jr., Plano, Tex., assignors to Motorola Inc., Schaumburg, Ill.

Filed Feb. 29, 1988, Ser. No. 161,650
Int. Cl.[4] H03F 3/16
U.S. Cl. 330—277 **4 Claims**



1. A gallium arsenide monolithic microwave integrated

circuit preamplifier having an input, an output, and first, second, third, fourth and fifth bias nodes, said circuit comprising:

a first stage having a common gate field effect transistor, said first stage providing a matched path for a received signal;

a second stage coupled to said first stage having a common source field effect transistor, said second stage capable of receiving an RF signal from said first stage and providing class A gain of said signal; and

a third stage coupled to said second stage having an open drain field effect transistor, said third stage capable of receiving a class A amplified signal from said second stage and providing class B gain of said class A amplified signal, wherein said first stage comprises:

a first field effect transistor having a gate, a source, and a drain, said gate of said first field effect transistor for coupling to a first source of supply voltage, and said source of said first field effect transistor coupled to said input;

a first resistor having a first terminal for coupling to said first source of supply voltage, and a second terminal coupled to said source of said first field effect transistor, and

a first inductor having a first terminal coupled to said drain of said first field effect transistor, and a second terminal coupled to said first bias node.

4,890,070

DEVICE TO CONTROL THE OUTPUT POWER OF A CLASS C AMPLIFIER

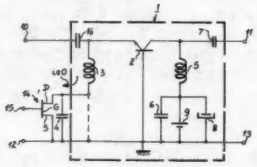
Guy Benahim, Champigny sur Marne; Jean-Michel Dutaut, Verrieres le Buisson, and Jean-Claude Giraudon, Meudon la Foret, all of France, assignors to Thomson-CSF, Paris, France

Filed Aug. 30, 1988, Ser. No. 238,760

Claims priority, application France, Sep. 8, 1987, 87 12443

Int. Cl.[4] H03F *3/191*

U.S. Cl. 330—296 **8 Claims**



1. A device to control the output power of an amplifier working in class C mode and comprising at least one bipolar transistor (2), including an emitter-base bias circuit, and to which a signal to be amplified is applied between the base and the emitter (10-12), an element inserted in said bias circuit having a resistance which varies as a function of a voltage Vgs applied to it (15-12) and means to apply the voltage Vgs to said element, said voltage Vgs applied to said element being chosen from a set of values defined experimentally as a function of at least one variable selected from the group consisting of output power to be obtained, input power, frequency of the signal to be amplified, and temperature of the bipolar transistor, wherein said element with variable resistance is a field effect transistor (14), the drain of which is connected to the emitter of said bipolar transistor and the source of which is connected to the base of said bipolar transistor, the voltage Vgs being applied to the gate and wherein said means to apply the voltage Vg comprise a memory, in which said set of values of Vgs is recorded in digital form, and which is addressed by at least one of several codes representing the output power to be obtained, the input power, the frequency of the input signal and the temperature of the bipolar transistor.

4,890,071

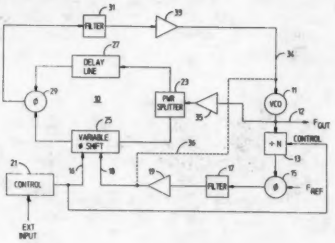
SIGNAL GENERATOR UTILIZING A COMBINED PHASE LOCKED AND FREQUENCY LOCKED LOOP

George S. Curtis, Spokane, Wash., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 26, 1988, Ser. No. 262,767

Int. Cl.[4] H03L *7/18, 1/02*

U.S. Cl. 331—11 **5 Claims**



1. A frequency synthesizer apparatus of the phase locked loop type comprising:

controlled oscillator means having an output terminal and a frequency control terminal, said controlled oscillator means providing an output signal to said output terminal having a selectable frequency determined by the magnitude of a frequency control signal applied to said frequency control terminal;

a first feedback path responsive to said output signal provided by said controlled oscillator means to said output terminal thereof for supplying a feedback signal to said frequency control terminal of said controlled oscillator means, said first feedback path including a frequency discriminator network including a first phase detector means having an output port and first and second input ports and first coupling means for coupling said output signal from said output terminal to said first and second input ports of said first phase detector means, time delay means having a time delay of Tau, said time delay means being connected to delay said output signal coupled t one of said first and second input ports, variable phase shift means having a phase shift control terminal, said variable phase shift means connected to shift the phase of the output signal coupled to one of said first and second input ports of said first phase detector, said first phase detector providing a first error signal to said output port thereof, the magnitude of said first error signal proportional to the difference in phase between the signals coupled to said first and second input ports of said first phase detector, said first error signal provided by said first phase detector coupled to said frequency control terminal of said controlled oscillator means;

a second feedback path responsive to said output signal provided by said controlled oscillator means to said output terminal thereof for supplying a feedback signal to said frequency control terminal of said controlled oscillator means, said second feedback path including a second phase detector means having an output port and first and second input ports, said first input port of said second phase detector coupled to said output terminal of said controlled oscillator means for receiving a signal at a frequency dependent on the output frequency of said controlled oscillator means, said second input port of said second phase detector means for receiving a reference signal having a predetermined frequency, said second phase detector providing a second error signal to said output port thereof, the magnitude of said second error signal proportional to the difference in phase between the signals coupled to said second phase detector, second

coupling means coupling said second error signal to said phase shift control terminal of said variable phase shift means for controlling the magnitude of the phase shift provided by said variable phase shift means; and

controller means responsive to an applied frequency selection signal representative of a currently selected controlled oscillator means output frequency, said controller means including means for providing a bias signal to said variable phase shift means that allows said variable phase shift means to provide as value of phase shift that causes the absolute value of said first error signal provided to the output port of said first phase detector to be equal to a minimum value when the current output frequency of the controlled oscillator means is equal to said currently selected controlled oscillator means output frequency.

4,890,072

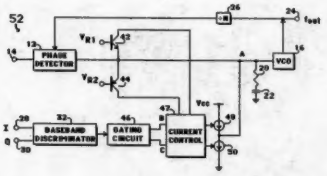
PHASE LOCKED LOOP HAVING A FAST LOCK CURRENT REDUCTION AND CLAMPING CIRCUIT

Roy H. Espe, Scottsdale, Ariz., and Lawrence M. Ecklund, Whenton, Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 3, 1988, Ser. No. 151,870

Int. Cl.[4] H03L *7/10*

U.S. Cl. 331—11 **14 Claims**



1. A circuit responsive to control signals applied thereto for alternatively sourcing and sinking current at an output, comprising:

a first controlled current source responsive to selective ones of the control signals for sourcing a current of a predetermined magnitude to the output of the circuit;

a second controlled current source responsive to other selective ones of the control signals for sinking a current of a predetermined magnitude from the output of the circuit; and

reducing means for respectively reducing said currents of said first and second controlled current sources whenever the voltage potential at the output of the circuit becomes greater than a first predetermined value or less than a second predetermined value respectively.

4,890,073

HIGH FREQUENCY GENERATOR FOR USE WITH LOADS SUBJECT TO GREAT IMPEDANCE VARIATIONS

Gerhard Flachenecker, Ottobrunn; Karl Fastenmeier, Munich, and Heinz Lindenmeier, Planegg, all of Fed. Rep. of Germany, assignors to Erbe Elektromedizin GmbH, Tubingen, Fed. Rep. of Germany

Filed Feb. 22, 1989, Ser. No. 314,413

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1988, 3805921

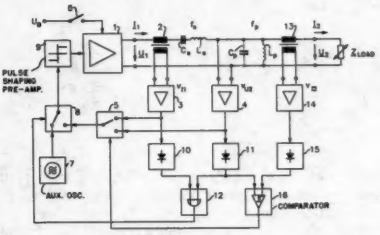
Int. Cl.[4] H03B *5/08, 1/02*

U.S. Cl. 331—55 **23 Claims**

1. High frequency generator for providing a high-frequency power input to a variable and/or unknown load impedance, comprising a power amplifier operating in a switching mode and having an output and a control input, an output filter network for connecting said amplifier output to a load impedance, said network comprising a series resonant branch tuned to about the midfrequency of operation of the generator and a parallel-resonant branch tuned to about the midfrequency of operation of the generator, said series resonant branch being interposed between said parallel resonant branch and the output of said power amplifier and further comprising:

means for supply of self-excitation of oscillation to said power amplifier constituted by feedback connections between said output filter network and said power amplifier said feedback connections comprising:

a current-driven feedback circuit comprising proportional electrical conversion means (**2, 3**) coupled to said series resonant network branch (L_s, C_s) and a pulse shaping stage (**9**) for providing current-driven feedback whenever the value of said load impedance (Z_{load}) falls below a predetermined characteristic impedance value (R_c);



a voltage-driven feedback circuit comprising proportional electrical conversion means (**4**) coupled to said parallel resonant network branch (L_p, C_p) and a pulse shaping stage (**9**) for providing voltage-driven feedback whenever the value of said load impedance (Z_{load}) rises above said predetermined characteristic impedance (R_c), and

first electronic switching means including an electronic switch element (**5**) for selectively switching into activity one or the other of said feedback circuits for assuring the transfer of feedback action between them in response to load impedance fluctuation during utilization of said generator.

4,890,074

QUARTZ MICROSTRIP GUNN OSCILLATOR

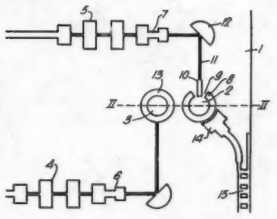
John Ondria, Nettleham, England, assignor to Marconi Electronic Devices Limited, England

Filed Feb. 9, 1989, Ser. No. 308,838

Claims priority, application United Kingdom, Feb. 8, 1988, 8902767

Int. Cl.[4] H03B *9/12*

U.S. Cl. 331—107 SL **6 Claims**



1. A microwave microstrip oscillator comprising a thin dielectric substrate; a Gunn diode mounted within the thickness of the substrate; an annular conductive resonator lying on the surface of the substrate and at least partially surrounding the Gunn diode; adjustable capacitive tuning means associated

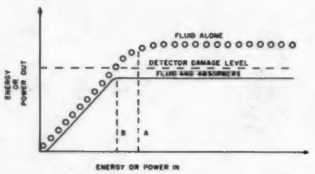
with the Gunn diode for controlling the frequency of oscillation of the Gunn diode; and microstrip circuit means coupled to the Gunn diode for extracting an output power signal at a desired microwave frequency.

4,890,075

OPTICAL RADIATION LIMITER

Juergen L. W. Pohlmann, Alexandria, Va.; Richard C. Honey, San Mateo, and John L. Guagliardo, Palo Alto, both of Calif., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jul. 31, 1986, Ser. No. 901,080
Int. Cl.[4] G02F *1/01*
U.S. Cl. 330—4.3 **3 Claims**



1. An optical energy and/or power limiter for protecting a sensitive optical detector from high-energy or high-power optical radiation and including:

a limiting cell containing a nonlinear optical fluid essentially transparent to optical radiation below a first energy or power threshold, and only partially transparent to said radiation above said threshold, and further containing optical radiation absorbers in the form of finely divided particles essentially uniformly distributed throughout said fluid and,

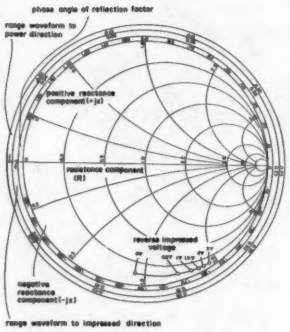
means for focusing said radiation into said cell, whereby said cell is interposed between said means and said detector is only partially transparent to radiation above a second energy or power threshold, and wherein said second threshold is lower than first threshold.

4,890,076

REFLECTION TYPE SSB MODULATOR

Kazutada Higashi, Tenri; Masamori Tokuda, Mie; Hiroshi Nakano, Tenri, and Tomozo Ohta, Ikoma, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 20, 1988, Ser. No. 183,983
Claims priority, application Japan, Apr. 20, 1987, 62-98367
Int. Cl.[4] H03C *1/12, 1/14, 1/60*
U.S. Cl. 332—170 **14 Claims**



7. An impedance transformation system in an SSB modulator for modulating radio frequency power, comprising:

driving voltage generation means for generating a driving voltage;

bias supply means for supplying said driving voltage to a variable impedance means;

variable impedance means for varying a load impedance, said variable impedance means varying its impedance in accordance with a varying of the driving voltage supplied thereto; and

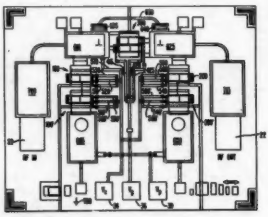
impedance transformation means responsive to said variable impedance means, for transforming an input impedance into a variable impedance dependent upon said variable load impedance, said impedance transformation means comprising a two-terminal pair network having linear mapping characteristics between said variable load impedance connected to one of said pair of terminals and said input impedance as seen from the other pair of terminals.

4,890,077

FET MONOLITHIC MICROWAVE INTEGRATED CIRCUIT VARIABLE ATTENUATOR

Horng-Jye Sun, Fremont, Calif., assignor to Teledyne MEC, Mountain View, Calif.

Filed Mar. 28, 1989, Ser. No. 329,625
Int. Cl.[4] H01P *1/22*
U.S. Cl. 333—81 A **38 Claims**



1. On a microstripline MMIC, a circuit for attenuating an RF microwave input signal in response to a single control signal, the circuit adapted to receive a first reference voltage, the circuit comprising:

a circuit input port having an input impedance, for receiving the RF microwave input signal from a signal source having a source output impedance; the input signal having a frequency range between about 2 GHz and about 20 GHz:

a circuit output port having an output impedance, for supplying an attenuation fraction of the RF microwave input signal to a load having a load input impedance;

a control port for receiving a single control signal whose amplitude varies the attenuation fraction of the RF microwave input signal reaching the circuit output port;

a first active variable conductance device having a first output lead coupled to the circuit input port, a second output lead coupled to the first reference voltage and a control lead D.C. coupled directly to the control port to receive the single control signal connected to shunt a signal at the RF circuit input port;

a second active variable conductance device having a first output lead coupled to the circuit output port, a second output lead coupled to the first reference voltage and a control lead D.C. coupled directly to the control port to receive the single control signal, connected to shunt a signal at the RF circuit output port;

a third active variable conductance device, having a first output lead coupled to the circuit input port, a second output lead coupled to the circuit output port and D.C. coupled directly to the control port to receive the single control signal, and a control lead coupled to a second reference voltage connected in series with the RF circuit input port and the RF circuit output port;

the conductance of each active device being variable in response to the magnitude of the single control signal;

a frequency dependent D.C. conductive circuit, coupled to

the first and second output leads of the third conductive device, for shunting a fraction of the input signal across the third conductive device, where the sum conductance of the frequency dependent circuit and the third conductive device is substantially constant over the frequency range of the input signal, thereby extending the frequency response of the attenuator while linearizing circuit attenuation and maintaining a substantially constant input and output impedance;

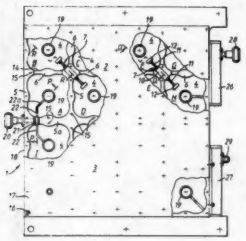
the varying conductance of the active devices varying the attenuation between the RF circuit input port and the RF circuit output port as the amplitude of the control voltage varies, while the input and output impedance is maintained substantially constant over a frequency range of about 2-20 GHz.

4,890,078

DIPLEXER

Christopher J. Radcliffe, Luton, Great Britain, assignor to Phase Devices Limited, Luton, England

Filed Apr. 12, 1988, Ser. No. 180,572
Int. Cl.[4] H01P *5/12*
U.S. Cl. 333—134 **8 Claims**



1. A diplexer comprising:

first and second signal filtering sections,

a common port coupled to both of said sections,

first and second ports respectively coupled to said first and second sections,

wall means defining a plurality of coaxial cavities, each of said cavities having a substantially square cross-section and having a central resonator disposed therein,

said cavities being disposed in each of said sections so that at least three adjacent cavities form a right triangular group in which two of said three cavities are aligned in a column and two of said three cavities are aligned in a row,

the cavities in said first section having irises for coupling together respective adjacent cavities on a main path between said first port and said common port, and the cavities in said second section also having irises for coupling together respective adjacent cavities on a main path between said second port and said common port, and

cross coupling means for coupling the diagonal cavities in each of said right triangular groups.

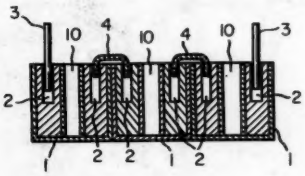
4,890,079

DI-ELECTRIC BANDPASS FILTER

Kanemi Sasaki, Tokyo, Japan, assignor to Kokusai Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 19, 1988, Ser. No. 246,448
Claims priority, application Japan, Oct. 26, 1987, 62-270960
Int. Cl.[4] H01P *1/202*
U.S. Cl. 333—206 **17 Claims**

1. A di-electric bandpass filter, in which one central conductive bore (10) for resonance and one or more non-metallized coupling bores (2, 2) are provided in an open face of a plurality of di-electric resonators (1, 1), said plurality of di-electric resonators (1, 1) being disposed so that the respective earth faces of adjacent di-electric resonators are in contact; said one or more non-metallized coupling bores (2, 2) of adjacent di-electric resonators being connected by coupling metal pieces (4, 4), and output and input matching pins (3) being inserted



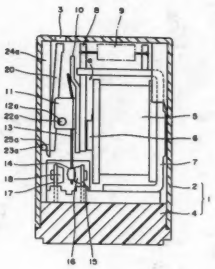
into one of said bores (2, 10) in the first and last of said di-electric resonators (1, 1) respectively.

4,890,080

ELECTROMAGNETIC RELAY WITH AN OPERATION INDICATING MEMBER

Hiroshi Hashimoto, Kashima, Japan, assignor to Omron Tateisi Electronics Company, Kyoto, Japan

Filed Sep. 1, 1988, Ser. No. 239,534
Claims priority, application Japan, Sep. 4, 1987, 62-135938[U]
Int. Cl.[4] H01H *73/12, 75/00, 77/00*
U.S. Cl. 335—17 **4 Claims**



1. An electromagnetic relay having an operation indicating member, comprising:

(a) a housing formed by a base and a case thereon;

(b) a window in said case;

(c) switching means in said housing, said switching means including an electromagnet, terminals on said base, contacts fixed on said terminals and a movable contact movable between the stationary contacts by the electromagnet;

(d) an indicating member supported by said case for indicating operation of said switching means through said window;

(e) a supporting member connected to said electromagnet for movably supporting said indicating member; and

(f) a movable member connected to said supporting member for bearing said movable contact.

4,890,081

CT QUICK CHANGE ASSEMBLY

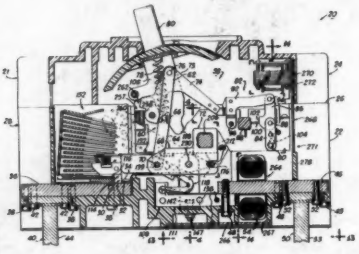
Jere L. McKee, Scott Township; William E. Beatty, Jr., and Glenn R. Thomas, both of Beaver, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 1, 1988, Ser. No. 226,648
Int. Cl.[4] H01H *73/00, 73/12, 75/00*
U.S. Cl. 335—18 **9 Claims**

1. A quick change assembly for a current transformer disposed within a circuit breaker having a housing including a

base and a cover, a pair of separable contacts, one or more line-side conductors, one or more load-side conductors, an operating mechanism, and an electronic trip unit comprising:

a main current transformer substantially disposed within a



cavity in said base, open on one side to allow the current transformer to be removed from the housing, said main current transformer disposed about one or the other of said line-side conductor or said load-side conductor; and

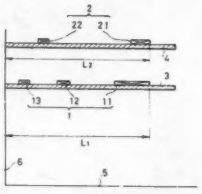
a removable cover plate for closing said cavity.

4,890,082

COIL FOR GENERATING A HOMOGENEOUS MAGNETIC FIELD

Michiru Fujita, Kawasaki, Japan, assignor to Fuji Electric Co., Ltd., Kawasaki, Japan

Filed Aug. 24, 1988, Ser. No. 235,934
Claims priority, application Japan, Aug. 29, 1987, 62-215778
Int. Cl.[4] H01F *7/00*
U.S. Cl. 335—301 **10 Claims**



1. A coil assembly for generating a homogeneous magnetic field including: a first coil unit having at least one coil being symmetric with respect to a common symmetry axis and a symmetry plane located perpendicular to said symmetry axis; and a second coil unit having at least one coil being symmetric with respect to said symmetry axis and said symmetry plane, a minimum internal diameter of the coil of said second coil unit being larger than a maximum external diameter of the coil of said first coil unit, and wherein:

said first coil unit comprises three pairs of coils;

said second coil unit comprises two pairs of coils;

the magnetic moment of said first coil unit is identical in magnitude to and reverse in direction to that of said second coil unit; and

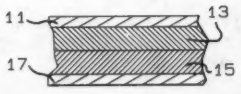
said first coil unit substantially reduces to zero the coefficients of the terms of the second to tenth order of Taylor's series expanded with respect to axial coordinate variables of distribution of magnetic fields on said symmetry axis generated by said first coil unit and said second coil unit.

4,890,083

SHHIELDING MATERIAL AND SHIELDED ROOM

George Trenkler, Providence, R.I.; Richard G. Delagi, Sharon, Mass.; Francois A. Padovani, Westwood, Mass., and Donald L. Winslow, Raynham, Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 20, 1988, Ser. No. 260,048
Int. Cl.[4] H01F *7/00*
U.S. Cl. 335—301 **32 Claims**



1. A shield material for electromagnetic radiations comprising:

(a) a first layer of ferromagnetic material having opposing major surfaces and having a relatively high permeability over a first predetermined electromagnetic energy intensity range;

(b) a second layer of ferromagnetic material having opposing major surfaces, one of said major surfaces being contiguous with one of the major surfaces of said first layer, said second layer having a relatively high permeability over a second predetermined electromagnetic energy intensity range different from said first range; and

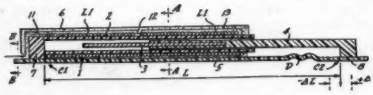
(c) a layer of highly electrically conductive material on the non-contiguous major surfaces of said first and second layers.

4,890,084

INDUCTANCE STRAIN GAUGE

Li Chu, Wuhan, China, assignor to The Institute of Rock & Soil Mechanics Academia Sinica, Wuhan, China

Filed May 12, 1988, Ser. No. 192,991
Int. Cl.[4] H01F *21/06*
U.S. Cl. 336—30 **13 Claims**



1. An inductance strain gauge for statically or dynamically measuring strain or stress of a specimen comprising:

a thin flat tubular coil frame having an open end;

two inductor coils consisting of wire wound on said frame in a single layer in the same winding direction and connected in series;

a thin flat magnetic core received in said frame and movable axially therein, said core normally being disposed approximately centrally between said two coils;

a thin flat elongated connected rod having a first end portion carrying said magnetic core inside said frame, said rod extending from said first end portion out through said open end of said frame to a second end portion thereof remote from said frame;

a substrate of sheet material having an intermediate portion adapted for extension and contraction, said coil frame and coils being attached and sealed to said substrate adjacent to said intermediate portion, said second end portion of said connecting rod being secured to said substrate at a location opposite said intermediate portion from said frame portion, said substrate being adapted for direct application to the specimen; and

a protective film covering said two coils and secured to and sealed with opposite margins of said substrate.

4,890,085

TERMINAL FITTED BOBBIN

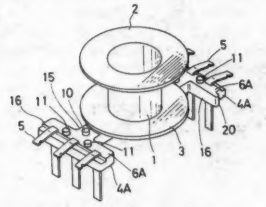
Kiyokazu Saito, and Hiraku Imaizumi, both of Chiba, Japan, assignors to TDK Electronic Co., Ltd., Japan

Filed Oct. 18, 1988, Ser. No. 259,308

Claims priority, application Japan, Oct. 21, 1987, 62-160021[U]; May 6, 1988, 63-60001[U]

Int. Cl.[4] H01F *15/10*

U.S. Cl. 336—192 11 Claims



1. A bobbin for winding a coil comprising a cylindrical bobbin body, first and second opposed flanges extending transversly from said body, said first and second flanges respectively having first sides facing each other and second sides opposing the respective first sides, at least one frame extending from the second side of and generally parallel to said first flange, said frame including a plurality of electrical terminals, a first projection disposed between said terminals and said first flange and generally extending toward said second flange for directing lead wires from coils wound around said body to at least some of said electrical terminals.

4,890,086

TRANSFORMER ASSEMBLY

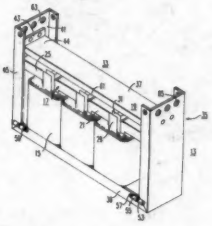
Norris L. Hill, New Bloomfield, Mo., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 4, 1989, Ser. No. 347,301

Int. Cl.[4] H01F *27/26, 41/00*

U.S. Cl. 336—210 12 Claims

1. A coil-core assembly of a transformer including coil means and core means and mounting means for said coil means and core means, said mounting means including a rigid U-shaped frame encompassing said coil means and core means and having a cross member from whose ends legs extend, the said assembly being characterized by that at the corners of said U-shaped frame said legs are at least in part prespaced from said cross member to facilitate insertion of the frame of the coil means and the core means and also characterized by means



connected to each leg and to said cross member near each corner for drawing said legs and said cross member together at each corner when said coil means and core means are encompassed by said mounting means so that said coil means and core means are firmly engaged by said frame and forces generated within said coil means and core means directed outwardly are effectively resisted.

4,890,087

Patent Not Issued For This Number

4,890,088

ENGINE MONITORING AND CONTROL APPARATUS

Arthur Woodell, P.O. Box 1092, Sandpoint, Id. 83864

Filed Feb. 16, 1988, Ser. No. 155,757

Int. Cl.[4] B60Q *1/00*

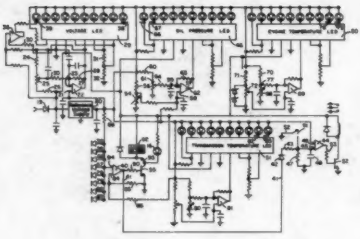
U.S. Cl. 340—459 2 Claims

1. A vehicle component monitoring and alarm system to indicate individual vehicle component condition comprising in combination:

gauge means having a display for continuously visually indicating monitored conditions of vehicle components, said gauge means including analog sensors responsive to said vehicle components' condition and analog to digital converter circuitry to relay a digital signal for visual indication of said component condition and said display comprising a plurality of bars, each bar formed of plural spaced color coded light emitting diodes and associated with each monitored vehicle component, and

alarm means operatively associated with said gauge means

for actuation when said gauge means receive and relay to said alarm means a signal caused by an undesirable monitored condition of an automotive component so moni-



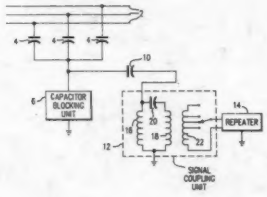
tored, said alarm means including a visual alarm and an audio alarm having switching means electrically associating said audio alarm to said gauge means for selective operation of said audio alarm.

4,890,089

DISTRIBUTION OF LINE CARRIER COMMUNICATIONS

Kenneth C. Shuey, Raleigh, N.C., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 25, 1988, Ser. No. 275,843
Int. Cl.[4] H04B *3/56*
U.S. Cl. 340—310 A **6 Claims**



1. Apparatus for coupling a high voltage power distribution system to a communications device, the system carrying electrical energy in the form of a high voltage at a power frequency and communications signals at a frequency higher than the power frequency, comprising:

capacitive power factor adjustment means connected to the distribution system to correct for baseline loading and inherent reactance of the distribution system;

blocking means connected between said adjustment means and ground, said blocking means having an impedance which varies directly with frequency such that the voltage across said blocking means at the power frequency has a value substantially less than the high voltage at the distribution system and the communications signal voltage across said blocking means has a value only slightly less than at the distribution system; and

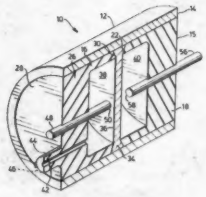
signal coupling means having a low impedance at the communications signal frequency and connected between said blocking means and said communications device for conducting communications signals between the distribution system and said device.

4,890,090

PRESSURE ALARM SYSTEM FOR MOTOR VEHICLE TIRES

Jan Ballyns, 1125 Meadowland Crescent, Pickering, Ontario, Canada L1X 1E5

Filed Jun. 6, 1988, Ser. No. 202,262
Int. Cl.[4] B60C *23/00*
U.S. Cl. 340—442 **6 Claims**



1. A pneumatically operated pressure sensitive electrical switch for detecting a hazardous rate of change of pressure in a pressure sensitive pneumatic system comprising;

(a) a housing having a pressure chamber formed therein,

(b) a flexible diaphragm mounted in said housing, said diaphragm forming a wall of said pressure chamber which serves to separate the pressure chamber from aid pneumatic pressure system in use, said diaphragm being free to move independently to and fro between a first position and a second position in response to said hazardous rate of change in the pressure in the pressure system, said diaphragm being sufficiently permeable to permit air to pass therethrough at a rate which will serve to permit equalization of the pressure on opposite sides of the diaphragm at a rate that would prevent the detection of a change in the pressure in said pressure sensitive system which occurs at a rate that is less than said hazardous rate, said diaphragm being sufficiently impermeable to prevent the passage of air therethrough at a rate which will serve to prevent equalization of the pressure on opposite sides of the diaphragm at a rate which would prevent the movement of the diaphragm from said first position to said second position when said hazardous rate of change occurs in the pressure in said pressure sensitive system,

(c) switch means carried by said housing and communicating with said diaphragm to open and close in response to movement of said diaphragm to and from between said first and second positions.

4,890,091

SELF CONTAINED COLLISION AVOIDANCE LIGHT

Gene F. Gage, Sr., and George Spector, both of 816 E. Corte Oro, Phoenix, Ariz. 85020

Filed Sep. 30, 1988, Ser. No. 252,383
Int. Cl.[4] B60Q *1/30*
U.S. Cl. 340—467 **2 Claims**

1. A self contained deceleration system for a motor vehicle which comprises:

(a) a housing:

(b) means for affixing said housing to rear portion of the motor vehicle;

(c) a first electrical circuit disposed within said housing;

(d) a power source electrically connected into said first circuit;

(e) a red stop light electrically connected into said first circuit;

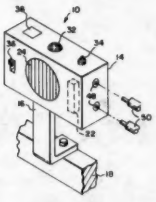
(f) an inertia switch normally spring biased in an open position and electrically connected into said first circuit whereby when the motor vehicle decelerates said inertia switch will momentarily go into closed position allowing said red stop ligh to illuminate to visually indicate that the

motor vehicle is slowing down, wherein said affixing means is a mounting bracket, further comprising;

(g) a second parallel electrical circuit disposed within said housing and electrically connected to said power source;

(h) an amber test light disposed on said housing and electrically connected into said second circuit;

(i) a test button switch normally spring biased in an open position and disposed on said housing and electrically connected into said second circuit so that when said test button switch is manually depressed said second circuit will close allowing said amber test light to illuminate to indicate that said power source is functioning, further comprising an on-off switch electrically connected into said first circuit so that a person can manually turn said first circuit so that a person can manually turn said first circuit on and off when so desired, wherein said power source is a battery, further comprising means for recharging said battery, wherein said recharging means is a solar



cell electrically connected to said battery so as to recharge said battery during daylight hours, wherein said inertia switch is electromagnetic to better retain said inertia switch in the closed position whereby reduction of inertia allows the spring to overcome the magnetic force thus returning said inertia switch back to its open position, further comprising:

(j) a third parallel electrical circuit disposed between said housing and a dashboard of the motor vehicle and electrically connected to said battery:

(k) a remote amber test light electrically connected into said third circuit and disposed into the dashboard; and

(l) a remote test button switch normally spring biased in an open position, electrically connected into said third circuit and disposed into the dashboard so that when said remote test button switch is manually depressed said third circuit will close allowing said remote amber test light to illuminate to indicate that said battery is functioning.

4,890,092

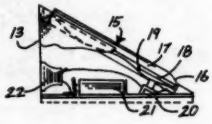
DOOR STOP ALARM

Virgil A. Grimm, 2760 34th St., Allegan, Mich. 49010

Filed Oct. 11, 1988, Ser. No. 255,942

Int. Cl.[4] G08B *13/08*

U.S. Cl. 340—546 **10 Claims**



1. A portable door-securing and alarm apparatus for positioning in contiguous relationship with a door comprising,

a wedge-shaped housing including a top wall, a rear wall, a plurality of side walls joining said rear and top wall and a bottom friction insert releasably secured to said side walls, and

a reciprocating switch positioned interiorly of said housing and extending outwardly of said top wall and in electrical communication with an internal switch to activate an alarm upon movement of said door over said top wall.

4,890,093

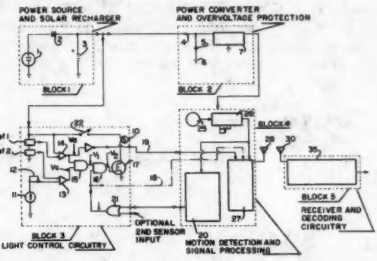
SOLAR POWERED PROXIMITY TRIGGERED LIGHT

James R. Allison, Mill Valley, and Garry J. Bolin, Danville, both of Calif., assignors to Schlage Lock Company, San Francisco, Calif.

Filed Oct. 27, 1988, Ser. No. 263,238

Int. Cl.[4] G01D *21/04*

U.S. Cl. 340—567 **8 Claims**



1. A solar powered proximity triggered light comprising:

means for collecting solar energy and converting it to electrical energy; means for receiving and storing said electrical energy, output means including a light for utilizing said electrical energy operable in response to a motion detection means sensing motion, and means for conditioning the response of said output means in response to sensed ambient conditions.

4,890,094

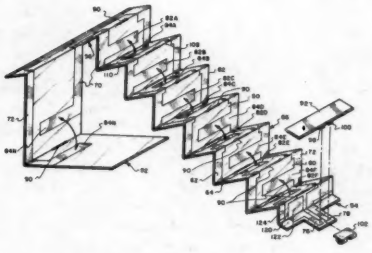
WALLET INCORPORATING CREDIT CARD ALARM SYSTEM

David Kopel, 10020-5 Larwin Ave., Chatsworth, Calif. 91311

Filed Oct. 7, 1988, Ser. No. 254,888

Int. Cl.[4] G08B *13/14*

U.S. Cl. 340—571 **11 Claims**



1. A nonrigid wallet structure comprising:

a single sheet of flexible dielectric material having first and second surfaces;

planar electrically conductive means carried on said dielectric sheet first surface forming a circuit path including at least one pair of first and second conductive areas spaced from one another to define a gap therebetween;

means folding said dielectric sheet upon itself at said gap for

forming a compartment wherein said first and second conductive areas are positioned opposite to one another;

resilient means including at least one resilient cushioning pad mounted on said dielectric sheet second surface for urging said first and second conductive areas into contact with one another; and

decorative flexible sheet means mounted on and covering said dielectric sheet while leaving said compartments open for receiving cards therein.

4,890,095

CIRCUIT ARRANGEMENT FOR AUTOMATICALLY MONITORING SEVERAL ANALOG ELECTRIC SIGNALS

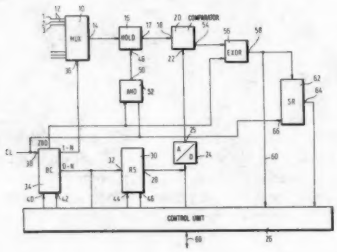
Wolfgang Esser, and Peter Jung, both of Paderborn, Fed. Rep. of Germany, assignors to Nixdorf Computer AG, Fed. Rep. of Germany

Filed Nov. 21, 1986, Ser. No. 933,740

Claims priority, application Fed. Rep. of Germany, Nov. 22, 1985, 3541343

Int. Cl.[4] G08B *21/00*

U.S. Cl. 340—657 **11 Claims**



1. A method for use in a circuit arrangement for automatically monitoring several, analog electric signals to maintain predetermined ranges of tolerances, comprising the steps of successive comparison of the analog electric signals with reference values, and generating and storing error alarm signals representative of the results of the successive comparisons, characterized in that the method further comprises the steps of:

assigning a range of tolerances to each of the analog electric signals, the range of tolerances defining the reference values;

accessing a reference value storage (30) in a sequence which is timed with the comparison of the analog electric signals by connecting the analog electric signals to be monitored to a comparator (20);

reading the range of tolerances defining the reference values from the reference value storage (30) and applying the reference values one after another to the comparator (20) in a timed relationship with the connection of the analog electric signals to the comparator (20);

generating from the comparator (20) a respective outlet signal representative of the comparison of the reference values with the analog electric signals; and

logically linking the respective outlet signal with an evaluating signal (ZB 0) so as to produce similar error alarm signals to be stored, the evaluating signal indicative of which one of a pair of the reference values is then applied to the comparator (20).

4,890,096

COORDINATE INPUT DEVICE WITH DISPLAY

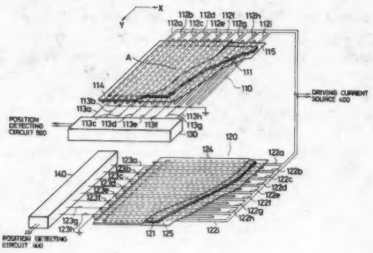
Yoshinori Taguchi, and Tsuguya Yamanami, both of Ageo, Japan, assignors to Wacom Co., Inc., Saitama, Japan

Filed Oct. 30, 1985, Ser. No. 792,995

Claims priority, application Japan, Oct. 30, 1984, 59-228440

Int. Cl.[4] G08C *21/00*

U.S. Cl. 340—712 **4 Claims**



1. A coordinate input device with a display comprising:

a tablet having two position detecting units each formed by alternately arranged exciting and detecting lines positioned in parallel to each other on a magnetic member in a sheet-like configuration, one of these units superimposed over the other so that the exciting and detecting lines of the one unit extend orthogonally with respect to those of the other;

a planar display superposed over said tablet;

a position designating magnetic generator for locally applying a magnetic bias to the magnetic members of said tablet;

a driving current source for supplying the exciting lines of each of the position detecting units of said tablet with an alternating current of a predetermined cycle;

a position detecting circuit connected to said tablet for detecting the coordinate values of a position designated by said position designating magnetic generator from induced voltages respectively generated from the detecting lines of each of the position detecting units of said tablet;

a display control circuit electrically connected to said tablet for driving said display;

a modulating and demodulating circuit for converting data represented by said coordinate values into a signal suitable for a transmission line, said modulating and demodulating circuit also capable of converting signals received from the transmission line into data representative of coordinate values; and

a processor connected to said position detecting circuit, said display control circuit and said modulating and demodulating circuit for providing controls thereto.

4,890,097

ACTIVE MATRIX CIRCUIT FOR LIQUID CRYSTAL DISPLAYS

Ichiro Yamashita, Katano, and Mamoru Takeda, Hirakata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 798,030, Nov. 14, 1985, abandoned. This application Jan. 21, 1988, Ser. No. 144,787

Claims priority, application Japan, Nov. 16, 1984, 59-242876; Apr. 19, 1985, 60-85241; Apr. 20, 1985, 60-83622

Int. Cl.[4] G09G *3/00*

U.S. Cl. 340—719 **10 Claims**

1. An active matrix circuit for liquid crystal displays comprising:

a plurality of liquid crystal pixels arranged in a matrix;

a scanning line driving circuit for producing successive

selection pulses which select said pixels in turn row by row;

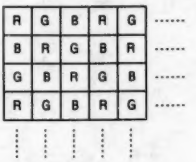
a plurality of scanning lines arranged in rows and respectively supplied with said successive selection pulses;

a signal line driving circuit for producing signal voltages which are supplied to said pixels to be selected;

a plurality of signal lines arranged in columns and supplied with said signal voltages; and

a plurality of switching elements responsive to said selection pulses on said scanning lines for supplying said signal voltages on said signal lines to said pixels,

wherein each pixel of said plurality of pixels is connected to at least two switching elements of said plurality of switching elements, said two switching elements being respectively connected to two adjacent scanning lines of said plurality of scanning lines to be respectively responsive to two of said successive selection pulses supplied to said two adjacent scanning lines to select said each pixel, and



wherein said plurality of switching elements includes at least one defective switching element which has at least a first terminal connected to a corresponding one of said plurality of scanning lines and a second terminal connected to a corresponding one of said plurality of signal lines, and wherein one of said first and second terminals of said at least one defective switching element is cut so as to be electrically isolated from the circuit.

4,890,098

FLEXIBLE WINDOW MANAGEMENT ON A COMPUTER DISPLAY

Antony J. O. Dawes, Berks, Okla., and Stephen R. Henson, Atlanta, Ga., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 20, 1987, Ser. No. 110,293
Int. Cl.[4] G09G *1/06*
U.S. Cl. 340—721 **6 Claims**

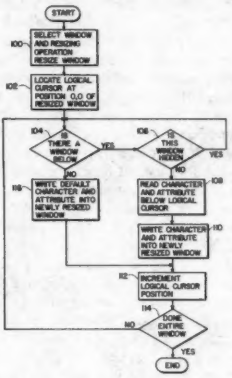
1. A method of managing a windowing system in a computer display comprising the steps of:

selecting a window to be resized from a plurality of windows on the computer display;

inputting dimension data defining resized dimensions of the selected window;

resizing said selected window on said display according to said inputted dimension data; and

automatically incorporating data from any other windows which may be below said resized window into said resized selected window while maintaining said other windows as independent entities, said incorporated data not being linked to said other windows.

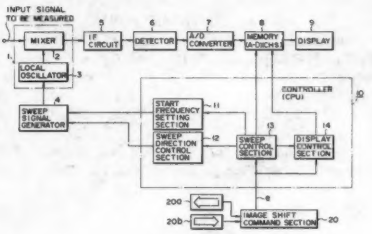


4,890,099

SIGNAL ANALYZER HAVING PARTIALLY SCROLLING FUNCTION FOR DISPLAY SCREEN

Mitsuyoshi Takano, Tokyo, Japan, assignor to Anritsu Corporation, Tokyo, Japan

Filed Mar. 2, 1988, Ser. No. 163,022
Claims priority, application Japan, Mar. 6, 1987, 62-51708
Int. Cl.[4] G09G *1/00*
U.S. Cl. 340—724 **14 Claims**



1. A signal analyzer, comprising:

input processing means for processing an input signal to be measured so as to output a predetermined digital signal corresponding to a predetermined frequency sweep range;

memory means, coupled to said input processing means, for storing the predetermined digital signal;

display means, coupled to said memory means, for displaying the predetermined digital signal store in said memory means as an image which is developed along a frequency axis;

scroll command means for providing a command for shifting the image displayed on said display means in a predetermined direction along the frequency axis by a predetermined distance; and

control means, coupled to said input processing means, said memory means, and said scroll command means, said control means being operative in a selected one of two modes wherein, in a first mode prior to receiving a command from said scroll command means, said control

means supplies to said input processing means a first control signal for causing said input processing means to process the input signal to be measured in a first frequency sweep range, and supplies to said memory means a second control signal for causing said memory means to store and read-out the predetermined digital signal, and wherein, in a second mode when the command from said scroll command means is received, said control means (a) supplies to said memory means a third control signal for causing an address range of said memory means to shift and for reading out of said memory means the predetermined digital signal corresponding to a portion of said first frequency sweep range in accordance with a content of said command, (b) supplies to said input processing means a fourth control signal for causing said input processing means to process the input signal to be measured in a second frequency sweep range in accordance with the content of the command, and (c) supplies to said memory means a fifth control signal for causing said memory means to store and read-out the predetermined digital signal corresponding to said second frequency sweep range,

wherein a first display condition is set on said display means in said first mode to display an image based on said first frequency sweep range; and a second display condition is set in said second mode in which the displayed image of said predetermined digital signal in said first frequency sweep range is shifted to a display portion in a predetermined direction relative to the displayed image in the first display condition in accordance with said command, while a remaining display portion is defined at the opposite side of the shift direction, and said predetermined digital signal in said second frequency sweep range is displayed successively on said remaining display portion, allowing said display means to display an image of the second frequency sweep range continuously with the image of the first frequency sweep range which is shifted in accordance with the command.

4,890,100

PICTURE PROCESSING APPARATUS INCLUDING A DUAL PORT MEMORY

Mitsuo Kurakake; Shoichi Otsuka, both of Hino, and Yutaka Muraoka, Hachioji, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

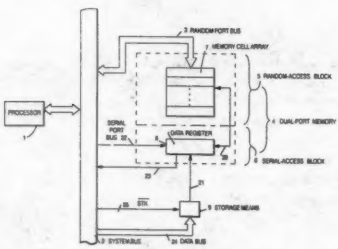
PCT No. PCT/JP87/00245, § 371 Date Sep. 1, 1987, § 102(e) Date Sep. 1, 1987, PCT Pub. No. WO87/06743, PCT Pub. Date Nov. 5, 1987

PCT Filed Apr. 17, 1987, Ser. No. 102,562

Claims priority, application Japan, Apr. 25, 1986, 61-095969

Int. Cl.[4] G09G *1/00*

U.S. Cl. 340—799 **19 Claims**



1. A picture processing apparatus having a picture memory and including a processor, comprising:

a dual-port memory connected to the processor by way of a serial port and a random port, said dual port memory comprising:

a memory cell array, having rows, randomly accessed by the processor by way of the random port for storing predetermined pixel information; and

a data register, having a serial input function, accessed by way of the serial port and adapted to transfer predetermined paint information to said memory cell array; and

storage means, accessed by the processor, for storing paint information to be transferred to said data register.

4,890,101

APPARATUS FOR ADDRESSING ACTIVE DISPLAYS

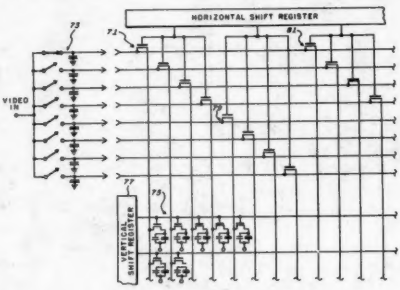
Allan I. Carlson, Briarcliff Manor, N.Y., assignor to North American Philips Corporation, New York, N.Y.

Continuation of Ser. No. 88,762, Aug. 24, 1987. This application Dec. 12, 1988, Ser. No. 283,355

The portion of the term of this patent subsequent to Dec. 26, 2006, has been disclaimed.

Int. Cl.[4] G09G *3/20*

U.S. Cl. 340—811 **8 Claims**



1. Apparatus for driving an active addressed display of the type employing display elements arranged in a matrix pattern wherein columns of display elements are coupled to vertical source lines each having an associated storage capacitor, comprising:

n circuits for sampling an input signal to obtain and hold sequentially occurring sampled signals, each signal; obtained over a time interval t_1;

n signal lines respectively coupled to said n circuits, each signal line coupled to m vertical source lines, thereby establishing m groups of n vertical source lines respectively coupled to n associated storage capacitors;

means coupled to said n circuits and said n associated storage capacitors in each of said m groups for sequentially transferring sampled signals from said n circuits to said n associated storage capacitors in each of said m groups, each sample signal transfer occurring over a time interval $t_2=(n-1)t_1$ and each group completing a cycle of receiving and transferring said sampled signals to said n associated storage capacitors over a time interval equal to $n \times t_1$; and

means coupled to said vertical source lines and said associated storage capacitors for coupling sampled signals stored in said associated storage capacitors to display elements of said matrix pattern.

4,890,102

VISUAL DISPLAY FOR COMMUNICATION NETWORK MONITORING AND TROUBLESHOOTING

Christopher J. Oliver, Rochester, N.H., assignor to Cabletron, Inc., Rochester, N.H.

Filed May 26, 1987, Ser. No. 54,311

Int. Cl.[4] H04Q *9/00*

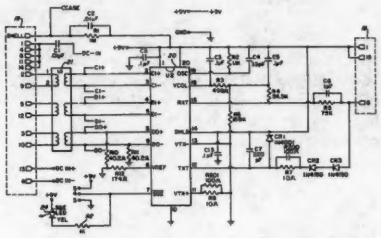
U.S. Cl. 340—825.17 **8 Claims**

1. A communication network transceiver assembly for interfacing between a communication bus and a host system, said transceiver assembly comprising:

transceiver circuit means for coupling a transmit signal from the host system onto the bus and for coupling data from the bus to form a receive signal supplied to the host system;

a housing for containing said transceiver circuit means; and

indicator means for providing on said housing visible displays of the presence of said transmit signal and said receive signal, said indicator means comprising a transmit LED, a transmit LED circuit responsive to said transmit signal for illuminating said transmit LED, a receive LED and a receive LED circuit responsive to said receive



signal for illuminating said receive LED, said transmit LED circuit and said receive LED circuit each comprising

an asymmetrical difference amplifier for providing an output in response to a differential input signal of prescribed amplitude, said differential input signal comprising the respective transmit signal or receive signal,

a pulse stretcher circuit responsive to the output of said difference amplifier for providing a pulse of prescribed duration, and

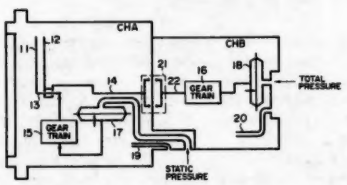
an LED driver circuit responsive to said pulse of prescribed duration for illuminating the respective LED.

4,890,103

RATE-OF-CLIMB INDICATOR

Shuji Nakamura, Komae, Japan, assignor to Tokyo Aircraft Instrument Co., Ltd., Tokyo, Japan

Filed Apr. 30, 1985, Ser. No. 729,158
Int. Cl.[4] G01C *21/10*
U.S. Cl. 340—968 **2 Claims**



1. A rate-of-climb indicator for indicating the intensity of wind shear encountered during the flight of an airplane, comprising:

a first sealed chamber for providing an indication of the rate-of-climb of said airplane, said first chamber including

a rate-of-climb capsule directly connected to a source of static pressure;

a first gear train coupled to said rate-of-climb capsule for amplifying the displacement thereof;

a rate-of-climb pointer rotatably mounted on a first axle connected to said first gear train, said rate-of-climb pointer indicating by the rotation thereof the amplified displacement of said rate of climb capsule;

a rate-of-speed pointer rotatably mounted on a second axle for rotation concentric with the rotation of said rate-of-climb pointer; and

capillary tube means connecting the interior of said first sealed chamber to said source of static pressure;

a second sealed chamber for providing an indication of the rate-of-speed of said airplane, said second chamber being separated from said first chamber by a common non-magnetic partition and including

a rate-of-speed capsule directly connected to a source of total pressure;

a second gear train coupled to said rate-of-speed capsule for amplifying the displacement thereof;

a third axle connected to said second gear train; and

means for connecting the interior of said second sealed chamber to said source of total pressure; and

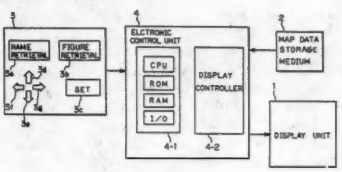
a non-contact rotation transmitting mechanism comprising first and second permanent magnets positioned on either side of said common partition, said first permanent magnet being coupled to said second axle and said second permanent magnet being coupled to said third axle, whereby the amplified displacement of said rate-of-speed capsule is transmitted to said rate-of-speed pointer.

4,890,104

ELECTRONIC MAP DISPLAY SYSTEM FOR USE ON VEHICLE

Kazunori Takanabe, Kasugai; Masaki Yamamoto, Nagoya; Kenzo Ito, Okazaki, and Hiroshi Fujinami, Anjo, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Division of Ser. No. 910,296, Sep. 17, 1986, Pat. No. 4,780,717.
This application Feb. 24, 1988, Ser. No. 160,010
Claims priority, application Japan, Mar. 25, 1983, 58-49957
Int. Cl.[4] G08G *1/12*
U.S. Cl. 340—995 **4 Claims**



1. An electronic map display system, comprising:

display means for displaying maps;

memory means for storing a plurality of sets of spot coordinates of spots defining respective routes, which routes, in turn, constitute said maps, each said set of spot coordinates indicating a point on a first coordinate system with respect to a predetermined coordinate reference point;

means for defining a region on said first coordinate system, said region corresponding to a single map to be displayed on said display means;

means for extracting from said memory means sets of spot coordinates of spots in said region;

means for converting each of said spot coordinates extracted by said extracting means into display coordinates with respect to a predetermined point of a second coordinate system of said display means so that said single map of said region defined by said defining means is displayed on said display means; and

means for displaying on said display means routes within said region which form said single map, said displayed routes including said display coordinates converted by said converting means and lines connecting said display coordinates converted by said converting means;

and means for individually selecting a specific route for

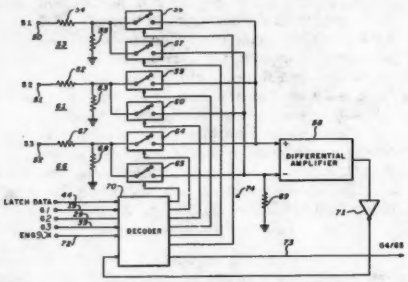
display by retrieving spot coordinates representing said selected route from said memory means.

4,890,105

STEP DATA PROCESSOR FOR 180X AND 90X COMPASS SYNCHRO DATA

Donald E. Bean, Ruckersville, and Billy M. Coleman, Fredricksburg, both of Va., assignors to Sperry Marine Inc., Charlottesville, Va.

Filed Sep. 17, 1987, Ser. No. 97,975
Int. Cl.[4] H03M *1/64*
U.S. Cl. 341—116 **17 Claims**



1. An apparatus for converting synchro data provided at a plurality of synchro output terminals to 1/6 degree step data comprising:

360X conversion means responsive to said synchro data at said plurality of synchro output terminals for providing a three digit step data code representative of 60° intervals of said synchro data at said plurality of synchro output terminals; and

180X conversion means for generating an additional step data code digit representative of 30° intervals within said 60° intervals including:

selector means responsive to said synchro data at said plurality of synchro output terminals and said three digit step data code for selecting one synchro output terminal of said plurality of synchro output terminals in accordance with said three digit step data code, and

comparator means responsive to synchro data at said one synchro output terminals for comparing synchro data at said one synchro output terminal to a predetermined reference for generating said additional step data code digit.

4,890,106

APPARATUS AND METHODS FOR DIGITAL-TO-ANALOG CONVERSION USING MODIFIED LSB SWITCHING

R. Allan Belcher, Swansea, United Kingdom, assignor to Burr-Brown Corporation, Tucson, Ariz.

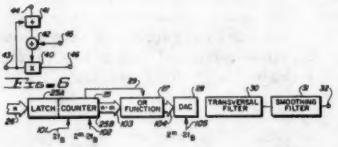
Division of Ser. No. 891,785, Jul. 30, 1986, Pat. No. 4,703,308, which is a division of Ser. No. 633,092, Jul. 23, 1984, Pat. No. 4,621,254, which is a continuation-in-part of Ser. No. 630,977, Jul. 16, 1984. This application Oct. 13, 1987, Ser. No. 108,583
Claims priority, application United Kingdom, Jul. 29, 1983, 8320534
Int. Cl.[4] H03M *1/66*
U.S. Cl. 341—144 **5 Claims**

1. A method for converting a plurality of digital signals to an analog signal, the method comprising the steps of:

(a) applying a most significant m bits of an n-bit digital signal to be converted, to m bits, respectively, of an m-bit digital-to-analog converter having an LSB current switch circuit, and substituting successive values of the n-bit digital signal at a first frequency;

(b) applying a least significant n—m bits of the n-bit digital signal to an interpolation circuit to produce an interpolation signal of the first frequency;

(c) applying the interpolation signal to an input of an LSB current switch circuit additional to the LSB current switch circuit of the m-bit digital-to-analog converter; and



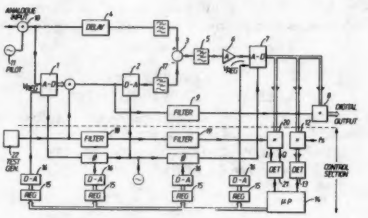
(d) combining an analog output signal produced by the m-bit digital-to-analog converter with an output signal produced by the LSB current switch circuit to produce an analog output signal with n-bit resolution.

4,890,107

ANALOGUE-TO-DIGITAL CONVERTER

Timothy H. B. Pearce, Springfield, United Kingdom, assignor to The General Electric Company, p.l.c., London, United Kingdom

Filed Mar. 10, 1988, Ser. No. 166,559
Claims priority, application United Kingdom, Mar. 12, 1987, 8705923
Int. Cl.[4] H03M *13/00*
U.S. Cl. 341—156 **29 Claims**



22. An analogue-to-digital converter comprising: a first stage including means for producing a predicted signal in digital form of an analogue signal at its input, and means for determining a band limited error signal representing the difference between said predicted signal and said input signal by comparing them in analogue form; said first stage including: a first signal path along which said analogue signal is transmitted to said means for determining an error signal; and a second signal path which includes analogue-to-digital converter means followed by digital-to-analogue converter means, said predicted signal in digital form being arranged to be passed to said second stage and the output of said digital-to-analogue converter means being applied to said means for determining an error signal;

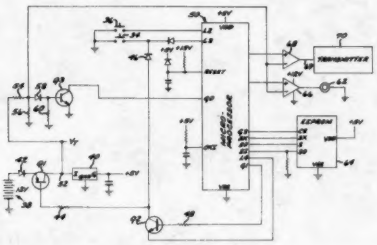
and a second stage comprising means for combining said error signal with said predicted signal to obtain a digital output signal, said second stage including a first signal path which includes analogue-to-digital converter means to which said error signal is applied, and a second signal path along which said predicted signal in digital form is transmitted.

4,890,108

MULTI-CHANNEL REMOTE CONTROL TRANSMITTER

Ze'Ev Drori, and Moti Segal, both of Chatsworth, Calif., assignors to Clifford Electronics, Inc., Chatsworth, Calif.

Filed Sep. 9, 1988, Ser. No. 243,080
Int. Cl.[4] H04L *9/04*
U.S. Cl. 341—176 **52 Claims**



1. A hand-held multi-channel remote control transmitter for transmitting a selected one of a plurality of possible channel codes preassigned for particular functions in a security system, comprising:

a transmitter housing:

a transmitter circuit for transmitting encoded radio frequency (RF) signals;

at least one user-actuated channel select switch mounted for convenient access by the user without opening said housing and having on and off states;

a user-actuated transmit switch mounted for convenient access by the user without opening said housing and having on and off states; and

a controller responsive to the states of said channel select and said transmit switches, said controller comprising:

means responsive to the number of times said channel select switch is actuated for providing a channel select count value;

means responsive to actuation of said transmit switch only when power is applied to the controller for providing a predetermined channel code in dependence on said channel select count value, where in actuation of said transmit switch is not operative to supply power to said controller, and wherein a different predetermined channel code corresponds to each channel count value, and for actuating said transmitter circuit to transmit a signal encoded with said selected channel code,

whereby said transmitter is capable of transmitting a selected one of a plurality of possible channel codes in dependence on the number of times said channel select switch is actuated.

4,890,109

LIGHTWEIGHT, BROADBAND, PULSED, FREQUENCY AGILE, SELF-SCREENING JAMMER FOR AIRBORNE DEPLOYMENT

Richard P. Gagliardi, Ridgecrest, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jul. 13, 1977, Ser. No. 819,073
Int. Cl.[4] G01S *7/38, 13/86*
U.S. Cl. 342—14 **10 Claims**

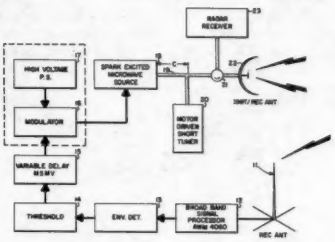
1. A microwave signal system comprising:

signal responsive means for producing an electrical output signal in response to ambient microwave energy;

modulator circuit means connected to said signal responsive means so as to receive said electrical output signal for producing a drive signal having a predetermined time relationship to said ambient microwave energy;

spark excited microwave generator means electrically connected to said modulator circuit means so as to receive said drive signal thereform and constructed so as to be actuated thereby for producing a microwave output signal;

microwave transmission means connected to said spark excited microwave generator means for transfer of the microwave output signal therefrom;



tuning means connected to said microwave transmission means to produce a ringing resonance therein and selectively controlled to alter the frequency of the ringing resonance within predetermined limits; and

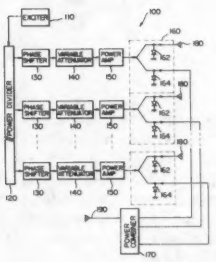
load means connected to said microwave transmission means for receiving the microwave energy therefrom.

4,890,110

MICROWAVE LANDING SYSTEM

Yoshihiko Kuwahara, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Dec. 30, 1988, Ser. No. 292,270
Claims priority, application Japan, Jan. 12, 1988, 63-5251
Int. Cl.[4] G01S *13/00*
U.S. Cl. 342—35 **3 Claims**



1. A microwave landing system for feeding predetermined power to an auxiliary antenna, comprising:

a power divider for dividing power in a distribution ratio which is associated with n radiating elements of a beam scanning antenna;

n phase shifters individually associated with said n radiating elements for providing fractions of the divided power with phases for effecting beam scanning;

n variable attenuators individually associated said n phase shifters for providing outputs of said phase shifters with attenuations of predetermined characteristics which are variable depending upon whether or not a beam scanning timing is reached;

n power amplifiers individually associated with said n variable attenuators for amplifying outputs of said variable attenuators to a predetermined level;

n ½ dividers individually associated with said n power ampli-

fiers for dividing outputs of said power amplifiers into two and each feeding one of resulting two outputs to said radiating element associated with said ½ divider, said ½ dividers each comprising two p-i-n diodes individually connected between opposite output terminals and ground and turning off said p-i-n diodes connected to said radiating element and turning on the other p-i-n diode at a beam scanning timing; and

a power combiner for combining said other output of said n ½ dividers being not connected to said radiating elements in a predetermined format and delivering a resulting combined signal to an auxiliary antenna located outside of said n radiating elements.

4,890,111

PASSIVE TRANSPONDER

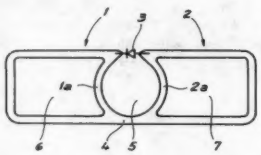
Richard Nicolet, Granges, and Daniel Koch, Crémines, both of Switzerland, assignors to ETA S.A. Fabriques d'Ebauches, Granges, Switzerland

Filed Oct. 20, 1987, Ser. No. 110,257

Claims priority, application Switzerland, Oct. 22, 1986, 04205/86

Int. Cl.⁴ G01S *13/80*

U.S. Cl. 342—51 **4 Claims**



1. A passive radio frequency transponder comprising two antenna elements coupled by a non-linear passive electronic component and by a conductor arranged in parallel with said passive electronic component, each of said antenna elements being formed by a metallic ribbon arranged in a planar loop surrounding a space devoid of any metallic elements, and said loops each having the general form of a rectangular trapezoid with a small base, a large base and a side perpendicular to said bases, wherein said small bases face and are parallel to one another, said electronic component is connected between said small bases, said perpendicular sides are aligned with one another and connected by a conductive portion formed by a metallic ribbon having a width less than the width of said perpendicular sides and disposed so its outer edge is aligned with the outer edge of said perpendicular sides, and said perpendicular sides each includes a rectilinear slot extending parallel to its length, closed on the side of said large base and opened on the side of said small base proximate said conductive portion, said conductor thus being formed by the portions of said perpendicular sides which are located outwardly of said slots and by said conductive portion, and the space bounded by the antenna elements, the passive electronic component and the conductor having substantially the form of a T, the horizontal bar of which is formed by said slots and the vertical bar of which is formed by said space separating said small bases between said passive electronic component and said conductor.

4,890,112

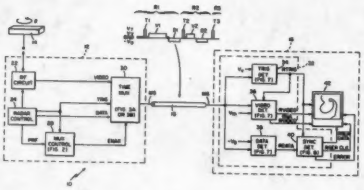
TIME MULTIPLEXED RADAR LINK

Michael D. Petito, Goffstown, and Peter Redes, Hollis, both of N.H., assignors to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 67,196, Jun. 29, 1987, abandoned. This application Nov. 16, 1988, Ser. No. 272,025

Int. Cl.⁴ G01S *7/04*; H04J *7/02*

U.S. Cl. 342—58 **29 Claims**



1. A method for sending multiple signals over a single cable, from a video source to a display, comprising the steps of:

coupling a trigger signal to the cable, the trigger signal having a minimum nominal voltage level;

coupling a time-length variable video signal to the cable, after the trigger signal is coupled, the video signal having a polarity and also a maximum amplitude less than the trigger pulse minimum nominal voltage;

determining when the time-length variable video signal terminates; and

coupling a data signal to the cable after determining that the time-length variable video signal has terminated, the data signal having a polarity opposite the video signal polarity.

4,890,113

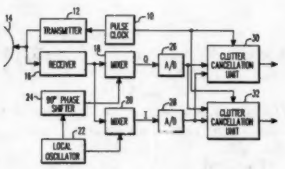
SECOND TIME AROUND CLUTTER CANCELLATION SYSTEM

Omar J. Jacomini, Severna Park, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 9, 1987, Ser. No. 130,706

Int. Cl.⁴ G01S *13/54*

U.S. Cl. 342—163 **9 Claims**



1. A clutter cancellation system, comprising:

means for transmitting groups of radar pulses with different pulse repetition frequencies from group to group and receiving groups of return pulses; and

clutter cancellation means for avoiding occurrence of blind target speeds and cancelling first and second time around clutter by weighting and accumulating the groups of the return pulses.

4,890,114

ANTENNA FOR A PORTABLE RADIOTELEPHONE

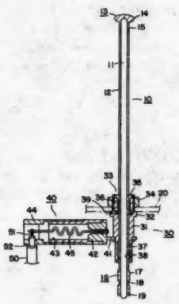
Yoshimi Egashira, Kanagawa, Japan, assignor to Harada Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 27, 1988, Ser. No. 186,805

Claims priority, application Japan, Apr. 30, 1987, 62-65678[U]

Int. Cl.[4] H01Q 1/24

U.S. Cl. 343—702 5 Claims



1. An antenna for a portable radiotelephone characterized in that said antenna comprises:

a rod-form transmitting and receiving antenna element arranged and configured such that substantially all of said antenna element can be freely inserted into or withdrawn from a case of said radiotelephone;

an antenna-retaining mechanism which holds said antenna element in a freely slidable manner and is equipped with a conductive part for making an electrical connection with a feeding point of said antenna element located at one end of said antenna element when said antenna element is extended outside of said case, and with a feeding point of said antenna element located at another end of said antenna element when substantially all of said antenna element is retracted inside of said case, said antenna-retaining mechanism being secured to said case by a fastening section which is outside of said case and an engaging section which is inside of said case;

a matching device installed inside of said case, one end of said matching device being connected to a conductive part of said antenna-retaining mechanism; and

a means for connecting the other end of said matching device to a transmitter-receiver set of said portable radiotelephone.

4,890,115

MAGNETIC ANTENNA

Michael F. Hartings, West Carrollton, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Feb. 10, 1988, Ser. No. 154,655

Int. Cl.[4] H01Q 7/04

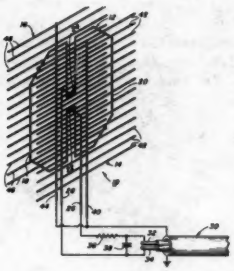
U.S. Cl. 343—742 10 Claims

1. A magnetic antenna, comprising:

means including an active element having two loops disposed adjacent each other in a generally coplanar relationship for generating a strong field that has a limited propagation distance near the antenna, said loops being connected together in a parallel connection;

means connected to the parallel connection of said loops for applying signals to said parallel connection to thereby cause currents to flow in opposite directions in said loops; and

means including a shield structure having a pair of generally planar shields disposed on opposite sides of said active element in a generally parallel relationship therewith for preventing the passage of the electric field of an electro-



magnetic radiation therethrough while permitting the passage of magnetic field radiation.

4,890,116

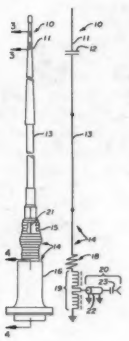
LOW PROFILE, BROAD BAND MONOPOLE ANTENNA

John R. Lewis, Jr., Chapin, S.C., assignor to Shakespeare Company, Newberry, S.C.

Filed Apr. 9, 1986, Ser. No. 849,884

Int. Cl.[4] H01Q 9/00

U.S. Cl. 343—749 5 Claims



1. A low-profile, monopole antenna operable over a predetermined broad band and connected to a transmission line, comprising

a radiator including means for providing a series capacitance, and radiator including first linear radiator and second linear radiator operatively connected to one end of said first linear radiator.

network means for substantially coupling and matching the impedance of the antenna with the impedance of the transmission line to which it is connected, said network means operatively connected to said radiator; and,

resistance means for minimizing the antenna's voltage standing wave ration (VSWR) over lower frequencies in said broad band to make tuning unnecessary and gain approximate that of a one-quarter wavelength monopole over substantially all frequencies in said broad band, said resistance means electrically connected in series between said network means and the end of said linear radiator opposite that connected to said first linear radiator, and the resistance of said resistance means reducing VSWR at the

lower frequencies in the range of approximately 30 MHz to 90 Mhz.

4,890,117

ANTENNA AND WAVEGUIDE MODE CONVERTER

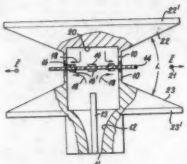
Frans C. de Ronde, Bath, England, assignor to National Research Development Corporation, London, England

Filed Jan. 14, 1988, Ser. No. 143,811

Claims priority, application United Kingdom, Jan. 20, 1987, 8701197

Int. Cl.[4] H01Q *13/04*

U.S. Cl. 343—773 **15 Claims**



1. An antenna comprising:

a waveguide which propagates waves along an axis thereof in a TM_{01} mode; and

a plurality of pairs of elongated coupling elements in a plane at right angles to the axis of the waveguide, each pair of elements comprising a first conducting element partly within the waveguide and aligned with an electric field of the TM_{01} mode, and a second conducting element external to the waveguide which is aligned with a required external electric field of the antenna, one end of the first element of each pair extending through an aperture in the waveguide so as to be adjacent to one end of the second element of that pair, and each second element forming a monopole with no corresponding element of the antenna forming a dipole with that second element.

4,890,118

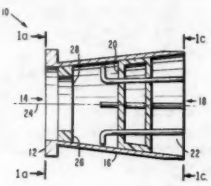
COMPENSATED MICROWAVE FEED HORN

Thomas Hudspeth, Malibu, and Fritz Steinberg, Culver City, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 27, 1988, Ser. No. 289,881

Int. Cl.[4] H01Q *13/02*

U.S. Cl. 343—786 **14 Claims**



1. A compensator for use in a microwave feed horn comprising a base having an input aperture and a conical horn portion extending from the base to an output aperture, which compensator reduces off-axis cross polarized components of circular polarized radiation emanating from the feed horn, said compensator comprising:

a plurality of L-shaped compensating conductors disposed symmetrically about a longitudinal axis of the feed horn and extending inwardly from its output aperture a predetermined distance toward the base and then radially outwards a predetermined distance away from the axis, and disposed at a predetermined angle relative to the axis;

a nonconducting support structure attached to the feed horn and to the plurality of compensating conductors for supporting the conductors within the feed horn; and

a matching member having a circular aperture of predetermined size disposed between the base and the compensating conductors for eliminating unwanted reflections created by the compensating conductors.

4,890,119

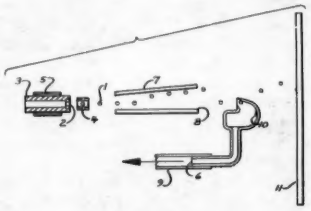
VARIABLE ORIENTATION INK CATCHER

Frank Eremity, Hanover Park, and George Arway, Norridge, both of Ill., assignors to A. B. Dick Company, Chicago, Ill.

Filed Jan. 12, 1989, Ser. No. 295,989

Int. Cl.[4] G01D *15/18*

U.S. Cl. 346—75 **6 Claims**



1. A variable orientation ink catcher for an ink jet system comprising:

a housing having an ink receiving portion, a reservoir portion and an outlet communicating ink from said reservoir portion back to said ink jet system for reuse;

said receiving portion including an opening for receiving ink drops and an arcuate rear surface spaced from said opening to stop said drops with minimal misting adjacent to said opening;

said reservoir portion constituting a cavity in said housing positioned below said ink receiving portion to permit collected ink to puddle therein;

said outlet being positioned in the lower portion of said reservoir and forwardly of said opening;

said housing having an axis extending through said opening and said reservoir being elongated along said axis to maximize the range of angular orientations at which the catcher can operate.

4,890,120

THERMAL TRANSFER TYPE PRINTING DEVICE CAPABLE OF SELECTING INK SHEETS

Eiichi Sasaki, Yokohama; Takashi Mori, and Tetsuo Watanabe, both of Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 27, 1988, Ser. No. 224,767

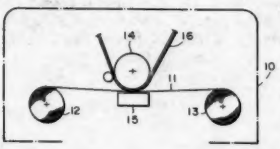
Claims priority, application Japan, Jan. 9, 1987, 62-132254[U]; Jul. 27, 1987, 62-185626; May 27, 1988, 63-128271

Int. Cl.[4] G01D *15/10*

U.S. Cl. 346—76 PH **26 Claims**

1. A thermal transfer type color printing device, in which one of a plurality of ink sheets is selectively used and a print control is performed in accordance with a sort of said ink sheet, said color printing device comprising:

(a) a thermal head provided with a plurality of heat generating resistors arranged therein,
(b) a plurality of ink sheets,
(c) installment means capable of selecting one of said plurality of ink sheets and selectively installing the same in said printing device,



(d) a recording medium brought into direct contact with said selected ink sheet,
(e) a heat energy source for driving said thermal head, and
(f) switching means for changing heat energy driving said thermal head in accordance with said sort of said selected ink sheet.

4,890,121

HALFTONE IMAGE PRINTING DEVICE

Shuzo Hirahara, Yokohama; Hitoshi Nagato; Kazuhiko Higuchi, both of Kawasaki; Kiyoshi Yamada, Chigasaki; Tadayoshi Ohno, Kawasaki, and Tsutomu Kanai, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

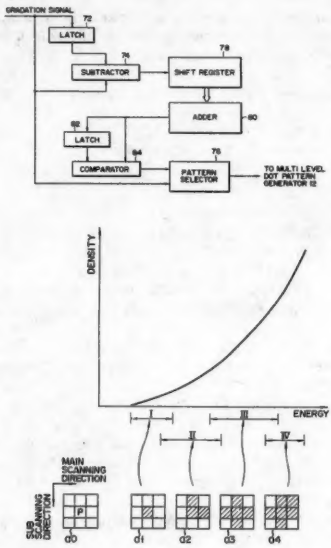
Continuation-in-part of Ser. No. 821,954, Jan. 24, 1986. This application Apr. 23, 1987, Ser. No. 41,875

Claims priority, application Japan, Jan. 31, 1985, 60-16768; Jun. 28, 1985, 60-142108; Sep. 24, 1985, 60-208823; Apr. 23, 1986, 61-93843

The portion of the term of this patent subsequent to Feb. 9, 2005, has been disclaimed.

Int. Cl.[4] G01D *15/10;* **H04N** *1/23;* **B41J** *3/20*

U.S. Cl. 346—76 PH **14 Claims**



1. A halftone image printing device for printing one pixel as a dot pattern constituted by a printing dot or printing dots in a dot matrix defined by dots arranged in main scanning and subscanning directions, comprising:

means for selecting a dot pattern among the predetermined dot patterns according to which of a plurality of density ranges, obtained by dividing an overall density range, includes a density of the pixel, said dot patterns being determined such that a dot pattern in the lowest density range is constituted by a discrete printing dot, and other dot patterns include a pattern of a one-lower density range and printing dots which are adjacent to the dot pattern of the one-lower density range in at least one of the main scanning and subscanning direction; and

means for thermally printing the dot or dots included in the selected dot pattern, the density of each of the printed dots being multilevel and changed in accordance with a density level of the pixel.

4,890,122

METHOD AND APPARATUS FOR INCREASING INKING RESOLUTION IN AN INK MOSAIC RECORDING DEVICE

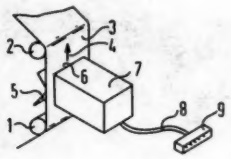
Kenth Nilsson, Akersberga, Sweden, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

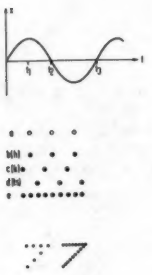
Continuation of Ser. No. 666,207, Oct. 29, 1984, abandoned. This application Aug. 26, 1986, Ser. No. 902,050

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1983, 3341399

Int. Cl.[4] G01D *15/18*

U.S. Cl. 346—140 R **10 Claims**





1. A method for increasing inking resolution of an ink-mosaic recording device having a recording head with a plurality of piezo-electric transducers arranged in a row, comprising the steps of:

ejecting recording fluid drop-wise towards a recording carrier through a piezo-electric deformation of the transducers;

deflecting the recording head periodically and transversely to a direction of ejection of the drops of fluid;

providing the deflection of the recording head as a fraction of a spacing of adjacent transducers, and providing the deflection as a periodical deflection at a frequency suffi-

ciently high such that a sufficiently large component of speed is superimposed on a drop of the ejected liquid transversely to the direction of ejection and in the direction of deflection of the recording head in order to shift when desired an encountering point of the drop on the recording carrier by a required distance substantially greater than the recording head deflection as a result of the superimposed component of speed; and

synchronizing the ejection of the drops of fluid with the transverse deflection.

4,890,123

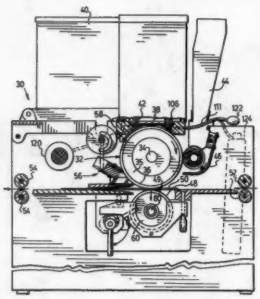
PRINT CARTRIDGE

Robert S. McCallum, Terra Cotta, and Dale E. Hendrikx, Bowmanville, both of Canada, assignors to Delphax Systems, Mississauga, Canada

Filed Aug. 1, 1988, Ser. No. 226,489

Int. Cl.[4] G01D *15/00*

U.S. Cl. 346—159 **15 Claims**



1. A print cartridge for use in charge transfer imaging comprising:

a dielectric substrate;

driver electrodes extending generally longitudinally along the substrate;

a first dielectric layer covering the driver electrodes;

finger electrodes extending generally transversely across the dielectric layer and defining apertures straddling the driver electrodes;

a second dielectric layer covering the finger electrodes and defining apertures corresponding to the apertures of the finger electrodes;

a screen electrode covering the second dielectric layer and defining apertures corresponding to the apertures of the finger electrodes and the second dielectric layer;

the apertures of the finger electrodes, the second dielectric layer and the screen electrode collectively defining a plurality of blind holes; and

a plurality of passages being provided through one or more of the components of the cartridge and having respective first and second ends, the first ends adapted for communication with an external fluid supply and the second ends opening into said blind holes, such that fluid from said supply may exit through the screen electrode apertures to prevent ingress of toner particles to the blind holes and to provide a purging effect to exhaust particles collecting in the holes.

4,890,124

PRINTING APPARATUS UTILIZING AN ELECTRIC FIELD APPLIED BETWEEN A CHARGE STORAGE LAYER ON A TRANSFER DRUM AND A PHOTOCONDUCTIVE LAYER MEMBER

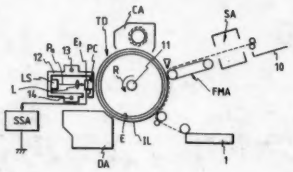
Itsuo Takanashi, Kamakura; Shintaro Nakagaki, Fujisawa; Hirohiko Shinonaga; Tsutou Asakura, both of Yokohama, and Masato Furuya, Yokosuka, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Jan. 23, 1989, Ser. No. 300,879

Claims priority, application Japan, Jan. 22, 1988, 63-12336

Int. Cl.[4] G01D *17/00*

U.S. Cl. 346—160 **9 Claims**



1. A printing apparatus comprising:

(a) a transfer member for receiving a charge pattern including:

(i) a charge storage layer member for storing said charge pattern; and

(ii) an electrode provided on one side of said charge storage layer member;

(b) a printing head including:

(i) a photoconductive layer member provided at the other side of said charge storage layer member;

(ii) a transparent electrode provided on said photoconductive layer member such that said charge storage layer member and said photoconductive layer member are interposed between said electrode and said transparent electrode; and

(iii) beam applying means for applying a constant laser beam to said photoconductive layer member from a side of said transparent electrode, said printing head being moved so as to scan on said transfer member;

(c) printing signal applying means for applying a printing signal between said transparent electrode and said electrode;

(d) developing means for developing said charge pattern; and

(e) photographic fixing means for fixing said developed charge pattern on a printing medium.

4,890,125

IMAGE FORMING APPARATUS FOR CONTROLLING IMAGE FORMING OPERATION IN ACCORDANCE WITH STATE OF CHARGER

Jiro Egawa, Yokosuka, and Naoaki Ide, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 19, 1988, Ser. No. 221,535

Claims priority, application Japan, Jul. 22, 1987, 62-180959; Jul. 22, 1987, 62-180960

Int. Cl.[4] G01D *15/00*

U.S. Cl. 346—160 **21 Claims**

1. An image forming apparatus having an image carrier comprising:

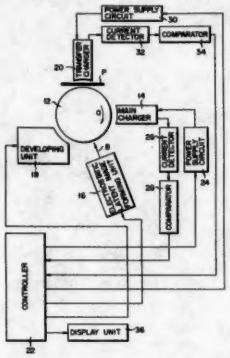
charging means for uniformly charging the surface of said image carrier;

power supply means for supplying an operation voltage to said charging means;

detection means for detecting a current flowing from said power supply means to said charging means;

comparison means for comparing a current value detected

by said current detection means with a predetermined value; and



means for stopping an image forming operation of the apparatus when the detected current value is different form the predetermined value.

4,890,126

PRINTING HEAD FOR INK JET PRINTER

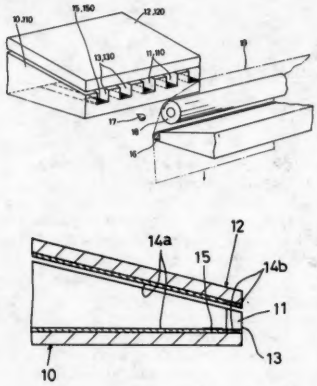
Hideo Hotomi, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jan. 27, 1989, Ser. No. 302,382

Claims priority, application Japan, Jan. 29, 1988, 63-20239; Jan. 29, 1988, 63-20240

Int. Cl.[4] G01D *15/18*; B41J *3/04*

U.S. Cl. 346—140 R **10 Claims**



1. A printing head for use in an ink jet printer, said printing head having an ink passage with an ink jet opening and an ink guide portion, wherein said ink jet opening is coated with an ink-phobic organic plasma polymer film and/or said ink guide portion is coated with an ink-philic organic plasma polymer film.

4,890,127

SIGNED DIGIT ADDER CIRCUIT

Henry M. Darley, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Mar. 31, 1988, Ser. No. 175,967

Int. Cl.[4] G06F *7/50*

U.S. Cl. 364—786 **26 Claims**

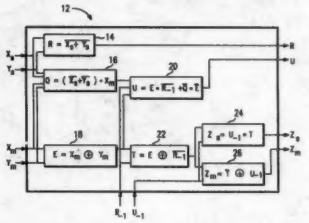
1. Apparatus for adding two signed digit addends, X and Y, each addend having a plurality of digits, each addend representable by logical sign portions, X_s and Y_s and logical magnitude portions, X_m and Y_m, comprising:

first logic circuitry for generating a first logical output for each digit of the respective addends based on the signs of the respective addends;

second logic circuitry to generate a first intermediate logical value for each digit of the respective addends from the sign and magnitude portions of the respective addends;

third logic circuitry to generate a second intermediate logical value for each digit of the respective addends from the magnitudes of the respective addends;

fourth logic circuitry for generating a second logical output from said first and second intermediate logical values and



from a first logical output generated for a preceding pair of signed digit addends;

fifth logic circuitry for generating a third intermediate logical value from said second intermediate logical value and from said first logical output generated for said preceding pair of signed digit addends; and

sixth logic circuitry for generating a sum digit for each pair of associated position digits of said addends from said third intermediate logical value and a second logical output generated for a preceding pair of signed digital addends.

4,890,128

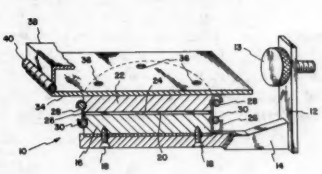
SHOCK ABSORBER FOR A BOW MOUNTED CAMERA

Bruce Kania, 717 S. 14th St., Bozeman, Mont. 59715

Filed Oct. 24, 1988, Ser. No. 261,733

Int. Cl.[4] G03B *29/00*

U.S. Cl. 354—76 **6 Claims**



1. Shooting apparatus comprising:

a shooting device for shooting a projectile in a shooting direction;

a camera;

shock absorption apparatus for absorbing shock in a generally horizontal plane when the shooting device is being used;

the apparatus being mounted to the shooting device for supporting the camera, the shock absorption apparatus including a first member having a flat surface and a second member having a flat surface;

the flat surface of the first member being positioned in mating and abutting relationship to the flat surface of the second member;

the shock absorption apparatus further including a resilient means for resiliently holding the flat surface of the first member in a facing and abutting position relative to the flat surface of the second member, whereby the two flat surfaces are parallel to a mating plane and slidable in all directions parallel to the mating plane;

a camera mounting means for mounting the camera to the second member of the shock absorption apparatus; and

a bow mounting means for rigidly mounting the first member of the shock absorption apparatus to the bow.

4,890,129

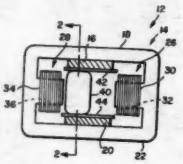
EXPOSURE CONTROL DEVICE

Hemant K. Mody, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 132,744, Dec. 14, 1987, abandoned. This application Apr. 4, 1989, Ser. No. 333,853

Int. Cl.[4] G03B *9/36*; H01H *47/00*

U.S. Cl. 354—234.1 **7 Claims**



1. An exposure control device for controlling the passage of light along an optical axis, said device comprising:

a frame, a substantial portion of said frame being formed of a magnetic material which provides a low reluctance path for magnetic flux;

a blade, a substantial portion of said blade being formed of a magnetic material which provides a low reluctance path for magnetic flux, said blade being movable relative to said frame along a generally linear path between a first position in which light passes along said axis and a second position in which no light passes along the axis;

magnetic means for forming a magnetic circuit adjacent said blade, said magnetic means being adapted to hold said blade in either of said positions and including a first permanent magnet located on one side of said generally linear path and a second permanent magnet located on an opposite side thereof, said magnetic means generating magnetic flux in said circuit for suspending said blade and for maintaining said blade in position relative to said frame along one degree of freedom; and

means for creating an imbalance in said circuit to effect movement of said blade relative to said magnetic means, said means for creating an imbalance including a first electromagnet located adjacent said first position and a second electromagnet located adjacent said second position and further including means for providing a train of pulses to said electromagnets.

4,890,130

LENS-FITTED PHOTOGRAPHIC FILM PACKAGE

Hisashi Takei, Kanagawa; Hiroshi Ohmura, Tokyo; Seimei Ushiro, Tokyo; Mitsuyoshi Mochida, Tokyo; Yoshihiko Nakamura, Kanagawa; Seiji Asano, Saitama, and Toshio Yoshida, Ibaragi, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

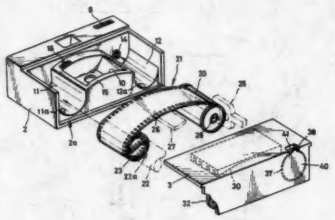
Filed Oct. 19, 1987, Ser. No. 111,156

Claims priority, application Japan, Oct. 17, 1986, 61-246979; Jan. 19, 1987, 62-5699[U]; Jan. 19, 1987, 62-5696[U]; Feb. 12, 1987, 62-30140; Aug. 19, 1987, 62-126190[U]

Int. Cl.[4] G03B *17/02, 17/00*

U.S. Cl. 354—288 **33 Claims**

1. A lens-fitted photographic film package comprising a light-tight film case with a taking lens fitted thereto, a separate empty film cartridge having a spool therein rotatable about an axis of rotation, said film cartridge being enclosed in said light-tight film case on one side of said lens, and an unexposed rolled film with one end retained on said spool in said empty film cartridge, said unexposed rolled film being disposed on the other side of said taking lens with its outermost turn in contact with said film case, said light-tight film case having a portion disposed only on said one side of said lens in alignment with said axis and which is openable only by destroying said film case on a preformed line of weakness bordering said portion, to form an opening for allowing said film cartridge to be removed.



4,890,131

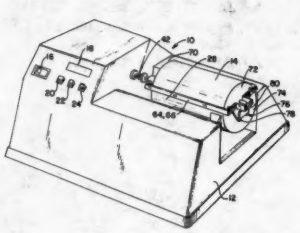
AUTOMATIC FILM PROCESSORS

Roman Kuzyk, 55 Florister Dr., Trenton, N.J. 08690, and Lewis M. Edwards, Trenton, N.J., assignors to Roman Kuzyk, Trenton, N.J.

Filed Feb. 28, 1989, Ser. No. 316,772

Int. Cl.[4] G03D *3/06*

U.S. Cl. 354—299 **14 Claims**



1. An automatic film processor for processing roll, sheet or disc film comprising, in combination:

A. removable drum means for storing said undeveloped film in a light free chamber, said drum means including;

(a) a single coupling connector port means utilized for the ingress and egress of chemical solutions,

(b) removable mounting means for mounting said film therein, said mounting means including,

(i) an agitating coupling means disposed on one distal end and extending external to said drum means; and

(c) a first reservoir, said first reservoir being adapted to receive a plurality of chemical solutions and said removable mounting means, a portion of said mounting means being submersible in said liquid chemical solutions;

B. housing means, said housing means including;

(a) a single mating coupling connector port means for the ingress and egress of said chemical solutions;

(b) heater and blower means for providing heated air over said drum means;

(c) first drive motor means, said driver motor means being adapted to be connected to a source of electrical power and including;

(i) a rotary output shaft having a mating agitating coupling means disposed on the distal end of said output shaft, said mating agitating coupling being adapted to be coupled to said drum means agitating coupling for transferring rotary and longitudinal motion to said drum means,

(d) linear valve means disposed in said housing means,

having an egress port and a plurality of ingress ports, each said ingress port being individually selectable and coupled to said chemical solutions;

(e) valve motor means disposed in said housing means, and coupled to said linear valve means for controlling the selection of only one chemical solution at a time, said valve motor means being adapted to be coupled to said source of electrical power,

(f) a second reservoir disposed in said housing for storing one of said liquid chemicals at a time, said second reservoir having;

(i) means for heating said chemical solutions to a prescribed temperature, when said solutions are disposed within said reservoir, and

(ii) stirring means coupled to said chemical solution for stirring said solution to provide a uniform temperature throughout said solution;

(g) first pump means coupled between said linear valve means and said second reservoir means for pumping said chemical solutions from said linear valve means to said second reservoir;

(h) second pump means coupled between said second reservoir and said first reservoir for pumping said heated chemical solutions from said second reservoir to said first reservoir;

(i) drain means, said drain means being coupled to said first reservoir for draining said chemical solutions therefrom when required; and

C. control means disposed within said housing for controlling the sequence and timing of each step of the automatic process and the flow of said chemical solutions, from the source of said chemical solutions, to and from said linear valve means, and said first and second reservoirs.

4,890,132

MANUAL CONTROL APPARATUS OF ZOOM LENS BARREL FOR AN AUTO FOCUS CAMERA

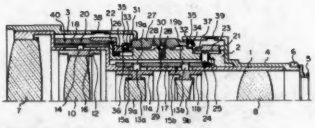
Yoshihiro Hama, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 22, 1988, Ser. No. 171,748

Claims priority, application Japan, Mar. 26, 1987, 62-73822; Mar. 26, 1987, 62-73823; Mar. 26, 1987, 62-45054[U]; Aug. 10, 1987, 62-200311

Int. Cl.[4] G03B *3/00, 5/00;* **G02B** *15/00, 7/02*

U.S. Cl. 354—400 **26 Claims**



1. A manual control apparatus of a zoom lens barrel for a camera comprising:

a lens barrel having a focusing lens group and a zoom lens group, each of the groups being enabled to be independently moved back and forth along the optical axis thereof;

a zooming mechanism for moving said zoom lens group back and forth along the optical axis thereof;

a focusing mechanism for moving said focusing lens group back and forth along the optical axis thereof; and

manual control means for selectively moving back and forth either said zoom lens group for said focusing lens group through its engagement either with said zooming mechanism or with said focusing mechanism when said means is so changed over, said manual control means being mounted on said lens barrel so as to rotate to move both said zoom lens group and said focusing lens group back and forth.

4,890,133

AUTOFOCUS CAMERA

Ryota Ogawa, Kawagoe; Shigeo Toji; Kazushi Yoshida, both of Tokyo, and Zenichi Okura, Ichikawa, all of Japan, assignors to Asahi Kogaku Kogyo K.K., Tokyo, Japan

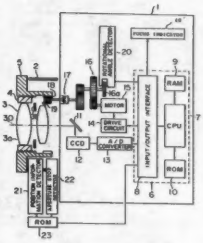
Continuation of Ser. No. 173,753, Mar. 25, 1988, abandoned.

This application Dec. 6, 1988, Ser. No. 280,586

Claims priority, application Japan, Mar. 26, 1987, 62-73827

Int. Cl.[4] G03B *3/00*

U.S. Cl. 354—402 **21 Claims**



1. An autofocus camera comprising:

a photographing lens system including at least one focus lens reciprocatively movable along a predetermined optical path;

drive means for reciprocatively moving said focus lens along said optical path;

means for detecting a position of said focus lens and for outputting a signal representative of position information;

means for calculating, on the basis of said position information outputted from said position detecting means, a correction amount with respect to a spherical aberration of said lens system at said detected position and for outputting a signal representative of the calculated correction amount; and

control means for controlling said drive means on the basis of said signal outputted from said calculating means so as to cause said drive means to move said focus lens to a position where said spherical aberration of said lens system is corrected.

4,890,134

PHOTOGRAPHIC INFORMATION SETTING DEVICE FOR A CAMERA

Akihiko Fujino; Hiroshi Ootsuka, and Tatsuro Izumi, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Mar. 9, 1988, Ser. No. 166,030

Claims priority, application Japan, Mar. 10, 1987, 62-35317[U]; Mar. 12, 1987, 62-36430[U]

Int. Cl.[4] G03B *7/00, 17/18*

U.S. Cl. 354—442 **13 Claims**

1. A photographic information setting device for a camera comprising:

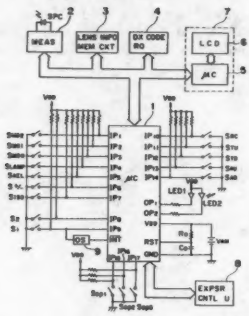
exposure information setting means for selecting a value from among values relative to exposure which are set in advance at predetermined regular intervals so as to set exposure information for a camera;

interval altering means for altering predetermined regular intervals of one type to ones of another type, and vice versa;

exposure controlling means for effecting an exposure control based on the exposure information set by the exposure information setting means;

exposure mode selecting means for selecting one mode from

among a plurality of exposure modes, inclusive of at least two different manual modes; and



alteration permitting means for permitting the interval altering means to carry out the interval alteration when either of the manual modes is selected.

4,890,135

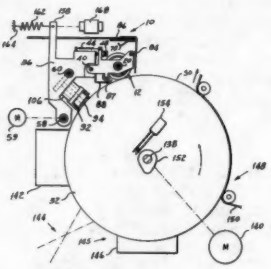
PHOTOCONDUCTIVE DRUM CLEANING APPARATUS

Kenneth W. Gardiner, Menlo Park; Tatsu Hori, Los Altos, and Norman F. Mangal, Palo Alto, all of Calif., assignors to Savin Corporation, Stamford, Conn.

Continuation of Ser. No. 154,109, May 28, 1980, abandoned, which is a continuation of Ser. No. 928,564, Jul. 27, 1978, abandoned, which is a continuation of Ser. No. 740,384, Nov. 10, 1976, abandoned, which is a continuation-in-part of Ser. No. 547,383, Feb. 6, 1975, abandoned. This application Jul. 1, 1982, Ser. No. 394,279

Int. Cl.[4] G03G *21/00*

U.S. Cl. 355—299 **27 Claims**



20. In an electrophotographic copier having a photoconductor adapted to bear an electrostatic latent image, said photoconductor being adapted to move successively through a developing station, a transfer station, and a cleaning station before returning to said developing station, means at said developing station for applying liquid developer to said photoconductor to form a developed image thereon, means at said transfer station for transferring said developed image to a carrier sheet, and a cleaning member at said cleaning station, the improvement comprising means for initially spacing said cleaning member from said photoconductor and means operable only upon the arrival at said cleaning station of a portion of said photoconductor wetted at said developing station for moving said cleaning member against said photoconductor to effect cleaning engagement therewith.

4,890,136

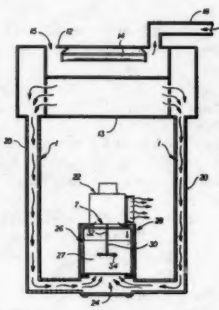
VENTILATING SYSTEM FOR DIAZO PROCESS PRINTING MACHINES

Michael Greene, Baltimore, Md., and Norman Michlin, Dearborn, Mich., assignors to Michlin Diazo Products, Dearborn, Mich.

Filed May 16, 1988, Ser. No. 194,205

Int. Cl.[4] G03D *7/00*; G03G *27/30*

U.S. Cl. 355—27 **11 Claims**



1. A ventilation system for a two chamber diazo copy machine of the type having an exposure chamber containing a source of illumination for exposure of an original image onto diazo copying material and a developer chamber utilizing ammonia vapors to develop the image on the diazo copying material, the ventilation system comprising:

means for ventilating the exposure chamber including:

inlet means for admitting ambient air into the exposure chamber; and

outlet means for venting hot air from the exposure chamber into the ambient environment;

means for ventilating the developing chamber including:

means for vacuum exhausting ammonia laden air from the developing chamber;

an absorber chamber in fluid communication with the developing chamber whereby ammonia laden fumes therefrom may be drawn into the absorber chamber; and

cartridge means disposed within the absorber chamber for selectively absorbing ammonia fumes.

4,890,137

IMAGE PROJECTION DEVICE FOR USE IN SLIT EXPOSURE OPTICAL SYSTEM

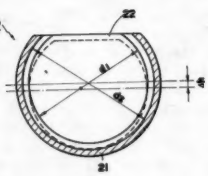
Haruhiko Hyodo, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 3, 1988, Ser. No. 227,825

Claims priority, application Japan, Aug. 4, 1987, 62-195538

Int. Cl.[4] G03B *27/34, 27/40, 27/70*

U.S. Cl. 355—57 **4 Claims**



1. In a copying machine of a compact configuration for reproducing copies of an original having a slit exposure system with a folded optical axis between the platen for supporting the

original and the photosensitive member, the improvement comprising:

an optical projection lens having along a major portion of its perimeter a continuous curving edge and along a minor portion of its perimeter a straight, flat edge chord forming equal angles with the optical axis of the lens and each end of the chord, and

a holder member contacting the projection lens at positions along the continuous curving edge, whereby mounting eccentricities effecting the optical performance are minimized.

4,890,138

IMAGE FORMING APPARATUS HAVING A PLURALITY OF DEVELOPING DEVICES

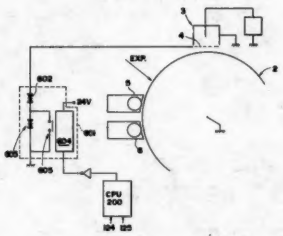
Hirohisa Miyamoto, and Naoyoshi Kinoshita, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 141,858, Jan. 22, 1988, abandoned. This application Mar. 20, 1989, Ser. No. 326,499

Claims priority, application Japan, Jan. 12, 1987, 62-4394

Int. Cl.[4] G03G *15/08*

U.S. Cl. 355—246 **8 Claims**



1. An image forming apparatus comprising:

a rotatable photosensitive member having a photosensitive layer over its surface;

a charger for charging the photosensitive member;

exposing means for exposing the photosensitive member to form an electrostatic latent image thereon;

a first developing device opposed to the photosensitive member for developing the electrostatic latent image formed on the member;

a second developing device positioned downstream from the first developing device with respect to the direction of rotation of the photosensitive member for developing the electrostatic latent image formed on the member; and

for controlling the output of the charger so as to elevate the surface potential of the photosensitive member by a predetermined potential when the second developing device is used, the predetermined potential being equal to a decay potential occurring while the surface of the photosensitive member rotates from the position opposed to the first developing device to the position opposed to the second developing device.

4,890,139

IMAGE FORMING APPARATUS

Kaoru Takebe, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Nov. 4, 1988, Ser. No. 267,296

Claims priority, application Japan, Nov. 7, 1987, 62-281357

Int. Cl.[4] G03G *21/00*

U.S. Cl. 355—268 **11 Claims**

1. An image forming apparatus capable of producing both a normal image and a reversal image, said image forming apparatus comprising:

a photosensitive member;

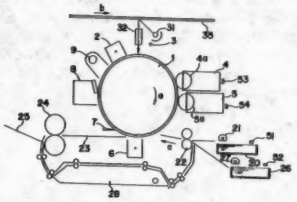
a means for charging said photosensitive member;

a means for forming an electrostatic latent image on said photosensitive member;

a first developing means for developing the electrostatic latent image using a first toner;

a second developing means for developing the electrostatic latent image using a second toner which is different in color from the first toner;

a first paper supply means for supplying a first paper into a transfer region confronting said photosensitive member, said first paper being the same in color as the second toner;



a second paper supply means for supplying a second paper into the transfer region, said second paper being the same in color as the first toner;

a first control means for controlling said first developing means and said first paper supply means in order to form a first toner image on the first paper;

a second control means for controlling said second developing means and said second paper supply means in order to form a second toner image on the second paper; and

a means for selecting either one of said first and second control means.

4,890,140

IMAGE FIXING APPARATUS

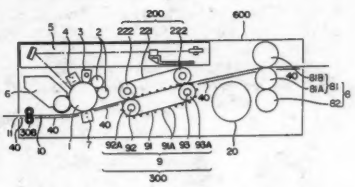
Ikuo Negoro, Sakado, and Masahiro Kita, Tokyo, both of Japan, assignors to Asahi Kogaku Kogyo K.K., Tokyo, Japan

Filed Apr. 1, 1988, Ser. No. 177,352

Claims priority, application Japan, Apr. 3, 1987, 62-82605; Apr. 24, 1987, 62-62402; Apr. 24, 1987, 62-62403

Int. Cl.[4] G03G *15/20, 21/00*

U.S. Cl. 355—290 **29 Claims**



1. An image fixing apparatus for fixing an image on a continuous form to record the image thereonto, the continuous form having sprocket holes formed along each of opposite side edges of the continuous form, which comprises:

drive means for driving the continuous form to travel along a predetermined path;

fixing roll means arranged in said predetermined path, for applying pressure and/or heat to the image to fix the same onto the continuous form; and

endless belt means arranged upstream of said fixing roll means with reference to a transport direction in which the continuous form travels along said predetermined path, said endless belt means having provided thereon a plurality of projections arranged in spaced relation to each other

along an outer peripheral surface of said endless belt means, said projections being engageable with the sprocket holes formed in the continuous form so that the continuous form transmits a driving force to said endless belt means, said endless belt means being capable of running in said transport direction while applying a predetermined back-tension to the continuous form traveling toward said fixing roll means along said predetermined path.

4,890,141

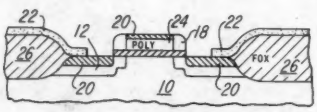
CMOS DEVICE WITH BOTH P+ AND N+ GATES

Thomas E. Tang, Dallas; Che-Chia Wei, Plano; Roger A. Haken, Richardson, and Richard A. Chapman, Dallas, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 83,933, Aug. 5, 1987, which is a continuation of Ser. No. 837,481, Mar. 7, 1986, abandoned, which is a continuation-in-part of Ser. No. 729,318, May 1, 1985. This application Jun. 29, 1988, Ser. No. 214,912

Int. Cl.[4] U01C *21/283*

U.S. Cl. 357—23.3 **41 Claims**



1. An integrated circuit device comprising:

(a) a first transistor having a first gate, said first gate being made of semiconductor material of a first conductivity type and covered with a conductive first thin film layer;

(b) a second transistor having a second gate, said second gate being made of semiconductor material of a second conductivity type which is opposite to said first conductivity type, said second transistor gate having a conductive second thin film layer spacially isolated from said first thin film layer;

(c) an interconnect layer distinct from said first and second thin film layers, said interconnect layer comprising titanium nitride, said interconnect layer ohmically connecting the conductive first thin film layer of said first gate with the conductive second thin film layer of said second gate.

4,890,142

POWER MOS TRANSISTOR STRUCTURE

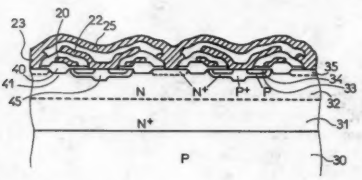
Eugène Tonnel, Meylan, and Gilles Thomas, Fontanil Cornillon, both of France, assignors to SGS-Thomson Microelectronics S.A., Gentilly, France

Filed Jun. 17, 1988, Ser. No. 208,224

Claims priority, application France, Jun. 22, 1987, 87 09157

Int. Cl.[4] H01L *29/78*

U.S. Cl. 357—23.4 **5 Claims**



1. A structure of a power MOS transistor comprising a plurality of transistor cells connected in parallel, each of which comprises on a common face of a substrate gate, source and drain contact zones and three levels of connection layers, a first level of said connection layers establishing a contact with all the gates and a connection between each gate and the adjacent gates, this first level of said connection layers comprising openings above the source and drain contact regions, further comprising:

a first insulation layer opened over the source and drain contact regions;

a second level of said connection layers, establishing a contact with all the source regions and drain regions and a connection between each source (or drain) region and the adjacent source (or drain) regions, with apertures insulating each drain (or source) contact;

a second insulation layer opened over the drain (or source) region; and

a third continuous level of said connection layers, establishing a contact with all the drain (or source) regions of the second level of said connection layers.

4,890,143

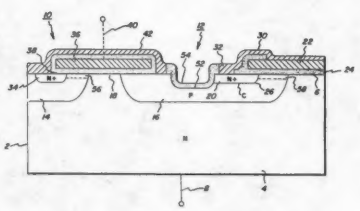
PROTECTIVE CLAMP FOR MOS GATED DEVICES

Bantval J. Baliga, and Charles S. Korman, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 28, 1988, Ser. No. 225,320

Int. Cl.[4] H01L *29/78*

U.S. Cl. 357—23.4 **16 Claims**



1. A self-protected MOS gated device, comprising:

a semiconductor substrate;

a drift region of a first conductivity type extending into said substrate from a principal substrate surface;

a base region extending into said drift region from said substrate surface and being of a second conductivity type opposite to the first conductivity type;

a source electrode in electrical contact with said base region at said principal surface;

a first gate disposed proximate to said principal surface and spaced therefrom by a first layer of insulation;

a gate contact abutting said principal surface and spaced from said source electrode for applying a gate drive voltage to said first gate; and

means for protecting said MOS gated device from surge voltages, including:

a well region extending into said drift region from said substrate surface and being doped to a first predetermined level of said second conductivity type; and

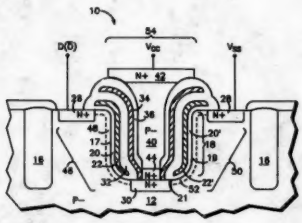
a first source region extending into said well region and being in electrical connection with, and abutting, said gate contact, said first source region being doped to a second predetermined level of said first conductivity type and forming a junction with said well region, said first and second predetermined levels of doping being selected to provide said junction with a breakdown voltage greater than a maximum expected value of gate drive voltage and less than the breakdown voltage of said first insulation layer;

said first gate partially overlying said first source and drift regions and overlying at least a portion of said well region positioned therebetween.

4,890,144
INTEGRATED CIRCUIT TRENCH CELL

Ker-Wen Teng; Karl L. Wang; Bich-Yen Nguyen, all of Austin, and Wei Wu, Round Rock, all of Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Sep. 14, 1987, Ser. No. 95,809
Int. Cl.[4] H01L 23/48
U.S. Cl. 357—23.4 19 Claims



1. An integrated circuit trench cell formed in a substrate, comprising:

a trench having:

at least one vertical wall;

and a bottom floor;

wherein the vertical wall has a top portion;

at least one field effect transistor (FET) in the vertical wall, wherein the FET has:

a source region and a drain region, one near the top portion of the wall and one in the bottom floor of the trench; and

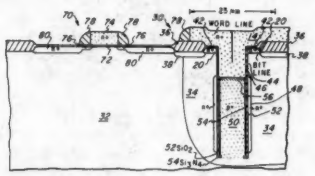
a gate region along the wall; and

a central load device within the trench, wherein the central load device is an active load device having top and bottom contacts, wherein the bottom contact of the load device is electrically connected to the FET in the vertical wall.

4,890,145
DRAM CELL AND ARRAY

Satwinder S. Malhi, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 244,575, Sep. 13, 1988, abandoned, which is a continuation of Ser. No. 153,546, Feb. 9, 1988, abandoned, which is a continuation of Ser. No. 924,117, Oct. 30, 1986, abandoned, which is a continuation of Ser. No. 646,663, Aug. 31, 1984, abandoned. This application Feb. 27, 1989, Ser. No. 316,587
Int. Cl.[4] H01L 29/78, 27/02, 29/06
U.S. Cl. 357—23.6 4 Claims



1. A memory cell comprising:

a substrate having a trench formed therein;

an insulating layer formed on the sidewalls of said trench;

a drain region formed in said substrate at the intersection between said trench and the surface of said substrate;

a doped storage region of opposite conductivity type of said substrate formed in said substrate adjacent to said insulating layer separated from said drain region by a channel region;

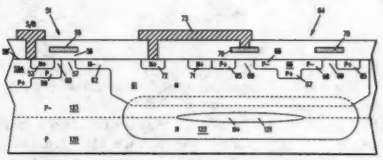
a region of conductive material formed in the bottom of said trench adjacent to said insulating layer, separated from said storage region by said insulating layer, said conductive material being in conductive contact with said substrate at a surface of said trench; and

a gate formed in said trench adjacent to but insulated from said channel region and vertically disposed above said region of conductive material.

4,890,146
HIGH VOLTAGE LEVEL SHIFT SEMICONDUCTOR DEVICE

Richard K. Williams, Cupertino; Steven H. Bolger, and Duane J. Rothacher, both of San Jose, all of Calif., assignors to Siliconix Incorporated, Santa Clara, Calif.

Filed Dec. 16, 1987, Ser. No. 133,710
Int. Cl.[4] H01L 27/04, 29/78
U.S. Cl. 357—23.8 41 Claims



1. A semiconductor device comprising:

a substrate of first conductivity type;

a body region of first conductivity type extending into said substrate from a surface, said body region having a doping level greater than the doping level of said substrate;

a source region of second conductivity type extending into said body region from said surface to a depth less than said body region extends into said substrate;

a combined drain resistor voltage divider region of second conductivity type extending into said substrate from said surface, said combined drain resistor voltage divider region having a first portion positioned adjacent to said body region and functioning as a drain region for said source region of second conductivity type, and a second portion positioned away from said body region;

a first contact region of second conductivity type extending into said second portion of said combined drain resistor voltage divider region from said surface to permit connection to an electrical potential;

a second contact region of second conductivity type extending into said combined drain resistor voltage divider region from said surface and being positioned between said first contact region and the edge of said combined drain resistor voltage divider region adjacent to said body region, said second contact region providing an electrical potential which is a function of the position of said second contact region with respect to said first contact region and the current flow in said combined drain resistor voltage divider region, whereby during operation of the semiconductor device the electrical potential provided by said second contact region has a magnitude which is between the electrical potential of said source region of second conductivity type and the electrical potential of said first contact region;

a channel region in said substrate extending to said surface between said combined drain resistor voltage divider region and said body region, a channel region in said body region extending to said surface between said source region and said channel region in said substrate;

an insulating material on said surface and extending from said source region to said combined drain resistor voltage divider region; and

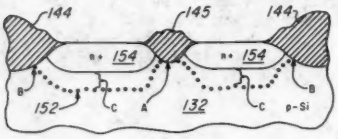
a gate on said insulating material, said gate being positioned above said channel region in said body region and said channel region in said substrate.

4,890,147

THROUGH-FIELD IMPLANT ISOLATED DEVICES AND METHOD

Clarence W. Teng, Plano, and Roger A. Haken, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 15, 1987, Ser. No. 38,388
Int. Cl.[4] H01C 29/77
U.S. Cl. 357—23.11 **3 Claims**



1. An integrated semiconductor circuit comprising:
a semiconductor substrate;
a first and a second field oxide region extending a first and a second distance, respectively, into said semiconductor substrate, wherein said first distance is less than said second distance;
a device region in said semiconductor substrate separating said first and second field oxide regions;
a substantially continuous layer of dopant extending through said first and second field oxide regions and through said substrate beneath said device region, wherein said layer of dopant has a peak concentration of dopant which is located substantially at said first distance into said substrate in said first and second field oxide regions.

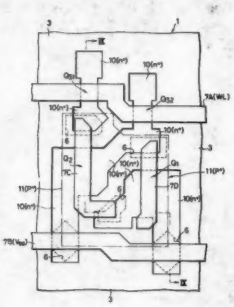
4,890,148

SEMICONDUCTOR MEMORY CELL DEVICE WITH THICK INSULATIVE LAYER

Shuji Ikeda, Koganei; Kouichi Nagasawa, Kunitachi; Satoshi Meguro, Tokyo, and Sho Yamamoto, Kodaira, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 764,208, Aug. 8, 1985, abandoned. This application Jul. 7, 1988, Ser. No. 218,486
Claims priority, application Japan, Aug. 31, 1984, 59-180533; Oct. 19, 1984, 59-218470; Oct. 19, 1984, 59-218471; Oct. 19, 1984, 59-218472
Int. Cl.[4] H01L 27/10
U.S. Cl. 357—45 **17 Claims**

1. A semiconductor integrated circuit device comprising:
word lines which are made of a double-layer film comprising a first film of polycrystalline silicon and a second film of a silicide formed as a compound of silicon and a refractory metal and which extend in a row direction over a semiconductor substrate;
data lines which extend in a column direction over said semiconductor substrate and two of which constitute one set of complementary data lines, each set of complementary data lines being connected to an identical memory cell;
a plurality of memory cells each of which comprises cross-coupled first and second MISFETs, first and second switching MISFETs being connected between said first and second MISFETs and said complementary data lines and having their gate electrodes connected to said word lines, said first and second MISFETs and said first and second switching MISFETs each comprising source and drain regions in said semiconductor substrate, and a gate electrode on a first insulation film on said semiconductor substrate; and
first wiring lines which are formed on a second insulation film on said semiconductor substrate, which serve to



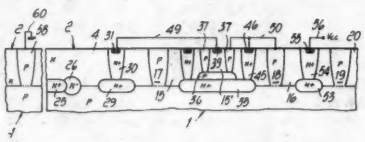
supply a ground potential to said memory cells, and which are made of the same layers as those of said word lines, wherein a thickness of said second insulation film is thicker than a thickness of said first insulation film.

4,890,149

INTEGRATED DEVICE FOR SHIELDING CHARGE INJECTION INTO THE SUBSTRATE, IN PARTICULAR IN DRIVING CIRCUITS FOR INDUCTIVE AND CAPACITIVE LOADS

Franco Bertotti, Milan; Paolo Ferrari, Gallarate, and Maria T. Gatti, Milan, all of Italy, assignors to SGS Microelettronica Spa, Catania, Italy

Filed Sep. 21, 1987, Ser. No. 99,044
Claims priority, application Italy, Sep. 25, 1986, 21817 A/86
Int. Cl.[4] H01L 27/04
U.S. Cl. 357—48 **10 Claims**



1. An integrated device for shielding charge injection into a semiconductor substrate, in particular, in driving circuits for inductive and capacitive loads, comprising:
a substrate having a first conductivity type,
an epitaxial layer superimposed on said substrate, having a second conductivity type opposite to said first conductivity type and defining a main face of the device, said epitaxial layer and said substrate defining together a junction,
a plurality of isolating regions having said first conductivity type, extending transversely to said epitaxial layer from said main face to said substrate and forming, in said epitaxial layer, at least one isolated epitaxial flyback pocket, said isolated epitaxial flyback pocket being connected to a load to discharge a flyback current and forming a flyback diode together with said substrate along a segment of said junction, and at least one circuit isolated epitaxial pocket accommodating the components of the circuit to be shielded;
a buried layer of said second conductivity type extending between said epitaxial flyback pocket and said substrate along a first part of said segment of said junction, said

buried layer having a side delimitation edge in a direction towards said circuit isolated epitaxial pocket, and

a distinct barrier region of said second conductivity type, said distinct barrier region being less doped than said buried layer and having a resistivity higher than said buried layer, said barrier region extending between said epitaxial flyback pocket and said substrate along a second part of said segment adjacent to said side delimitation edge of said buried layer in a direction towards said circuit isolated epitaxial pocket.

4,890,150

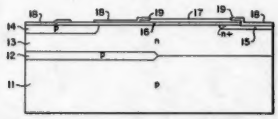
DIELECTRIC PASSIVATION

Eduardo S. Vera, New York, and Edward H. Stupp, Spring Valley, both of N.Y., assignors to North American Philips Corporation, New York, N.Y.

Filed Dec. 5, 1985, Ser. No. 805,500

Int. Cl.[4] H01L *29/34*

U.S. Cl. 357—52 **10 Claims**



1. A semiconductor device comprising a substrate layer of a first conductivity type, an epitaxial layer of a second conductivity type overlying said substrate layer, an insulator layer covering at least a portion of said epitaxial layer, and a passivating layer of a high dielectric constant on said insulating layer, said high dielectric constant being at least approximately 80.

4,890,151

THIN-FILM AND ITS FORMING METHOD

Masahiro Kameda, Ibaragi; Yojiro Kamei, and Kenichi Kurihara, both of Ikeda, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 719,742, Apr. 4, 1985, abandoned, which is a continuation-in-part of Ser. No. 588,659, Mar. 12, 1984, abandoned. This application Nov. 29, 1988, Ser. No. 279,232

Claims priority, application Japan, Mar. 12, 1983, 58-40007; Aug. 23, 1983, 58-153409; Aug. 25, 1984, 59-175830; Oct. 11, 1984, 59-211255; Dec. 8, 1984, 59-258467

Int. Cl.[4] H01L *23/48*

U.S. Cl. 357—65 **18 Claims**

1. An IC having an electrically insulating layer and an interconnection pattern formed on said electrically insulating layer and comprising a film of an annealed metal material into which hillock-preventing impurities have been introduced following the formation of the film and prior to its annealing, to a dose of at least about 5×10^{14} impurity ions per square cm of film and a peak depth after annealing of less than about 800 angstroms from a surface of said interconnection pattern.

4,890,152

PLASTIC MOLDED CHIP CARRIER PACKAGE AND METHOD OF FABRICATING THE SAME

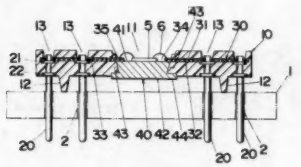
Atsuomi Hirata, Nara, and Hirokuni Mamiya, Yokkaichi, both of Japan, assignors to Matsushita Electric Works, Ltd., Kadoma, Japan

Filed Jan. 29, 1987, Ser. No. 8,222

Claims priority, application Japan, Feb. 14, 1986, 61-31355; Apr. 30, 1986, 61-100019; Apr. 30, 1986, 61-100020

Int. Cl.[4] H01L *23/28*

U.S. Cl. 357—72 **24 Claims**



24. A plastic molded chip carrier package comprising:

a carrier member for mounting an integrated circuit chip at a central portion, said carrier member, being made of a plastic material of a flat configuration, having a top surface and a bottom surface and having a center recess in which the integrated circuit chip is mounted;

a plurality of I/O pins each having a shoulder at a top end portion integrally embedded into said carrier member to protrude from the bottom surface thereof;

a plurality of metallized layers which are integrally embedded within the carrier member in a stacking relation to each other, said metallized layers being provided with respective center openings having a common center and being of sizes smaller than said center recess of the carrier member, each of said metallized layers having a plurality of conductor lines formed on a substrate for electrical interconnection between terminals of the integrated circuit chip and corresponding I/O pins, said shoulder of each I/O pin being in supporting contact with said substrate of a corresponding metallized layer, the conductor lines of each metallized layer having inner lead ends arranged on an inner peripheral edge portion around the center opening thereof, and said center opening being of a size larger in an upper metallized layer than in a lower metallized layer such that the inner lead ends of the conductor lines on the metallized layers are exposed in the center recess of the carrier member in a staggered relation with each other for permitting the conductor lines of the individual metallized layers to be connected to the integrated circuit chip at the staggered inner lead ends;

a heat sink integrally embedded into the center portion of said carrier member with a bottom surface exposed to the bottom surface of the carrier member and with a top surface defining the bottom surface of said center recess for mounting thereon said integrated circuit chip; and

at least one pair of positioning studs integrally molded with the carrier member to project from the bottom surface thereof for abutment against a support member on which the package is to be mounted with I/O pins plugged into metallized through holes formed therein for positive positioning of said package on the support member; wherein each of said metallized layer has a plurality of through holes into which corresponding I/O pins extend respectively with distal top ends projecting above the conductor lines, the upper metallized layer having clearance holes which are in registration with the through holes in the

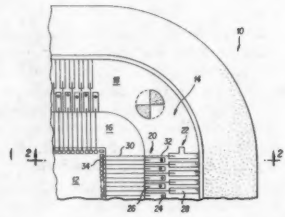
lower metallized layer and into which extend the distal top ends of the I/O pins which are to be electrically connected to the conductor lines of the lower metallized layer; said carrier member being formed in the top surface at the through hole locations with soldering pits in which the distal top ends of the I/O pins are exposed together with adjacent portions of the corresponding conductor lines while the conductor lines located around the clearance holes in the upper metallized layer being sealed behind a surrounding wall of the soldering pits; and said soldering pits being filled with a soldering material for providing permanent interconnection between the I/O pins and the corresponding conductor lines in the respective metallized layers.

4,890,153

SINGLE BONDING SHELF, MULTI-ROW WIRE-BOND FINGER LAYOUT FOR INTEGRATED CIRCUIT PACKAGE

Ching-An Wu, San Jose, Calif., assignor to Fairchild Semiconductor Corporation, Cupertino, Calif.

Filed Apr. 4, 1986, Ser. No. 848,302
Int. Cl.[4] H04N *9/16*
U.S. Cl. 357—74 **7 Claims**



1. A package for an integrated circuit comprising:
plural layers, said package defining a cavity, a first of said layers defining a bonding shelf adjacent said cavity;
bonding pads arranged on said bonding shelf in plural rows including an outer row spaced from said cavity and an inner row located between said outer row and said cavity;
electrical contacts physically connected with said package, said contacts providing for electrical communication with an incorporating system; and
conductive paths, each path providing an electrical connection between at least one of said contacts and at least one of said bonding pads, said conductive paths including a first conductive path electrically connecting a first of said bonding pads of said inner row with a first of said contacts, said first conductive path including a conductive first segment disposed upon a second of said layers, said first conductive path including a via electrically connecting said first bonding pad with said first segment so that said first conductive path is electrically isolated from all conductive paths of said outer row.

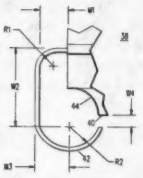
4,890,154

SEMICONDUCTOR PACKAGE PROFILE

Vahak K. Sahakian, Los Altos Hills, Calif., assignor to LSI Logic Corporation, Milpitas, Calif.

Filed Mar. 2, 1988, Ser. No. 163,342
Int. Cl.[4] H01L *23/30, 23/04*
U.S. Cl. 357—74 **6 Claims**

1. An integrated circuit package for use with electrical leads extending from a surface of said package, said package having opposed top and bottom surfaces and a peripheral surface and wherein said leads each have a first portion extending from the peripheral surface of the package and a second, arc-shaped, portion extending to a position adjacent to said bottom surface of said package;
wherein the peripheral and bottom surfaces are connected



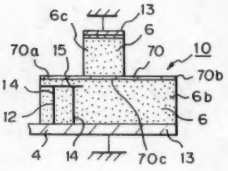
by an arc-shaped surface arched inwardly of the body of said package;
and wherein the arc-shaped portions of the leads and the arc-shaped surface share a common radius center point.

4,890,155

PACKAGE FOR MOUNTING A SEMICONDUCTOR CHIP OF ULTRA-HIGH FREQUENCY

Fumio Miyagawa; Hiroyuki Sakai, both of Nagano, and Toshikazu Takenouchi, Nakano, all of Japan, assignors to Shinko Electric Industries Co., Ltd., Nagano, Japan

Filed Apr. 22, 1988, Ser. No. 184,775
Int. Cl.[4] H01L *23/02*
U.S. Cl. 357—74 **11 Claims**



1. A package for mounting thereon a chip, such as a semiconductor chip, which can operate in a range of ultra-high frequency, comprising:
an insulation layer on which input and output conductive patterns are formed, said insulating layer having a lower surface;
a ground layer provided on the lower surface of said insulation layer; and
adjusting means including electrical conductive material provided in said insulation layer in the vicinity of said conductive patterns for adjusting the characteristic impedance of said conductive patterns, said adjusting means comprising a conductive metallized layer and at least one via hole filled with said electrical conductive material connected to said metallized layer and said ground layer.

4,890,156

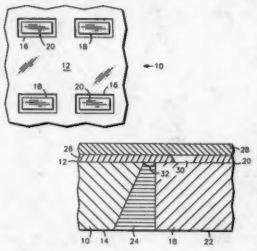
MULTICHIP IC MODULE HAVING COPLANAR DICE AND SUBSTRATE

James E. Drye, Mesa, and Steven L. Post, Tempe, both of Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Division of Ser. No. 25,687, Mar. 13, 1987, Pat. No. 4,792,533.
This application Aug. 5, 1988, Ser. No. 205,970
Int. Cl.[4] H01L *23/02, 23/12*
U.S. Cl. 357—74 **8 Claims**

1. A multichip integrated circuit module having coplanar dice and substrate comprising:
a silicon wafer having a first surface, a second surface and a plurality of die openings therethrough;
a plurality of dice each having a first surface and a second

surface, said plurality of dice glass bonded into said plurality of die openings of said silicon wafer so that said first surface of said silicon wafer and said first surfaces of said plurality of dice lie in a common plane; and



a layer of polyimide film adhered and pressed to said first surfaces of said silicon wafer and said plurality of dice.

4,890,157

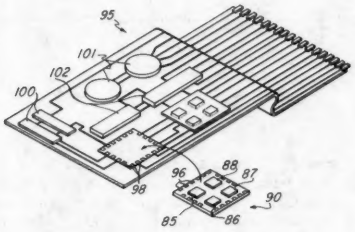
INTEGRATED CIRCUIT PRODUCT HAVING A POLYIMIDE FILM INTERCONNECTION STRUCTURE

Arthur M. Wilson, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 824,403, Jan. 31, 1986. This application Jul. 13, 1987, Ser. No. 72,371

Int. Cl.[4] H01L *23/08*

U.S. Cl. 357—80 **6 Claims**



1. An integrated circuit product comprising:

an interconnection film of alternating layers of conductor and polyamic acid resin having a circuit element attachment area attachable to a preselected integrated circuit chip.

4,890,158

RECURSIVE NOISE REDUCTION FILTER FOR VIDEO TEST APPARATUS

Daniel G. Baker; William J. Cooper, both of Aloha, and Bruce J. Penney, Portland, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Sep. 15, 1988, Ser. No. 244,876

Int. Cl.[4] H04N *17/12*

U.S. Cl. 358—10 **19 Claims**

1. An apparatus for measuring a characteristic of a video system in response to a vertically coherent video test signal comprising:

means for generating a demodulated signal from an output video signal of the video system corresponding to the video test signal; and

means for reducing the noise bandwidth of the demodulated signal without degrading the signal spectrum of the demodulated signal.

2. An apparatus as recited in claim 1 wherein the reducing means comprises a recursive noise filter having a comblike frequency characteristic so as to integrate vertically correlated portions of the demodulated signal that occur at a horizontal line rate while averaging the noise content of the demodulated signal.

4,890,159

ENDOSCOPE SYSTEM AND METHOD OF UNIFYING PICTURE IMAGES IN AN ENDOSCOPE SYSTEM

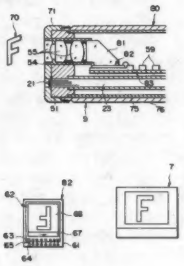
Hisao Ogiu, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Dec. 13, 1988, Ser. No. 283,826

Claims priority, application Japan, Feb. 4, 1988, 63-25446

Int. Cl.[4] A61B *1/04*; H04N *7/18*

U.S. Cl. 358—98 **21 Claims**



1. An endoscope system in which the displayed image is unified comprising:

a plurality of types of endoscope apparatuses, each having an elongate insertable part, an image forming optical system provided in a tip part of said insertable part and an imaging means imaging an object image formed by said image forming optical system, at least one type of said plurality of types of endoscope apparatuses being different from the other types in respect to whether the object image formed by said image forming system is a right image or a mirror image;

a signal processing apparatus, used in common with said plurality of types of endoscope apparatuses, said signal processing apparatus using a same process in response to the type of the endoscope apparatus with respect to an inversion between the right image and the mirror image and said signal processing apparatus processing an output signal of said imaging means of each endoscope apparatus to be a video signal; and

a first unifying means for unifying the picture image in the signal output from said plurality of endoscopes to be the right image or the mirror image and for inputting the unified picture image into said signal processing apparatus, said first unifying means formed as counterparts to each of said endoscope apparatuses to unify the picture image in the signal output by the endoscope apparatuses and the first unifying means.

4,890,160
TV PICTURE MOTION VECTOR MEASUREMENT BY CORRELATION OF PICTURES

Graham A. Thomas, Tadworth, United Kingdom, assignor to British Broadcasting Corporation, London, England

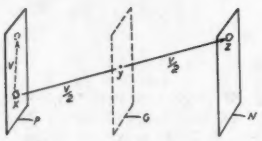
PCT No. PCT/GB87/00796, § 371 Date Jan. 19, 1988, § 102(e) Date Jan. 19, 1988, PCT Pub. No. WO87/05769, PCT Pub. Date Sep. 24, 1987

PCT Filed Dec. 23, 1986, Ser. No. 126,108

Claims priority, application United Kingdom, Mar. 19, 1986, 8606809; Jul. 16, 1986, 8617320

Int. Cl.[4] H04N 7/18, 7/12

U.S. Cl. 358—105 **27 Claims**



1. A machine method of TV picture motion measurement, comprising a first step of correlating first and second pictures to determine correlation as a function of selective displacement, thereby to determine a plurality of peak correlation values corresponding to respective motion vectors, and a second step of testing for each of a plurality of elementary areas of the pictures which of these motion vectors gives the best fit in deriving one of the pictures from the other, and wherein said second step comprises the following operations:

(a) an elementary area of a picture is derived from said first picture using each of said motion vectors determined in said first step, thereby to form a set of derived elementary areas corresponding to said motion vectors respectively;

(b) each derived elementary area is compared with the corresponding elementary error as a sum over the elementary areas of the magnitudes of the differences between corresponding points of said elementary areas;

(c) that one of said motion vectors which results in the smallest comparison error is selected as giving the best fit in deriving said elementary area of said second picture from said elementary area of said first picture;

(d) repeating operations (a), (b) and (c) for each of said plurality of elementary areas.

4,890,161
DECODING APPARATUS

Tetsujiro Kondo, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Jan. 30, 1989, Ser. No. 303,272

Claims priority, application Japan, May 2, 1988, 63-25377

Int. Cl.[4] H04N 7/137

U.S. Cl. 358—135 **13 Claims**

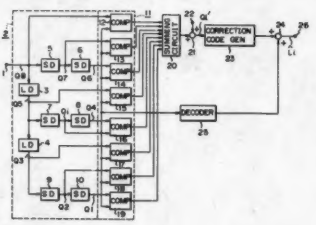
1. A decoding apparatus for decoding data transmitted from a coding apparatus, comprising:

means for generating sample data adjacent to a sample datum to be decoded;

comparator means for comparing datum corresponding to the sample datum to be decoded and data corresponding to said adjacent sample data and providing respective comparison outputs;

correcting data generating means supplied with said comparison outputs of said comparator means for generating a correcting datum;

decoding means for decoding an original datum from said sample datum to be decoded; and



means for combining said correcting datum with said original datum decoded from the sample datum to be decoded.

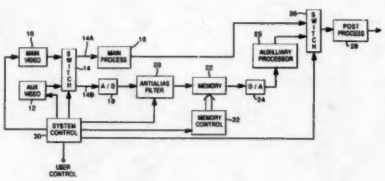
4,890,162
ADJUSTABLE ANTIALIAS FILTERS

David L. McNeely, Indianapolis, and Russell T. Fling, Noblesville, both of Ind., assignors to RCA Licensing Corporation, Princeton, N.J.

Filed Jan. 26, 1989, Ser. No. 301,923

Int. Cl.[4] H04N 7/13, 5/272

U.S. Cl. 358—138 **10 Claims**



1. Apparatus for filtering a signal, comprising:

a signal input terminal for providing a sampled data signal, samples of said sampled data signal occurring at a rate F_S;

scaling and combining means for combining two signals in proportions of K and (1−K) respectively (K a variable), having a first input terminal coupled to said signal input terminal having a second input terminal, an output terminal for providing filtered signal, and a control terminal for applying values representing said variable K;

delay means having input and output terminals respectively coupled to the output and second input terminals of said scaling and combining means;

means for programmably providing to said control terminal repeating sequences of said values representing said variable K, the number of values in each sequence determining the bandwidth of said filtered signal, and successive values in each sequence representing decreasing values of K.

4,890,163
INTERRUPTING A TRANSITION SEQUENCE BETWEEN VIDEO SOURCES

Brion Johnson; Michael R. Kesti, both of Nevada City, and Keith Y. Reynolds, Grass Valley, all of Calif., assignors to Grass Valley Group, Inc., Grass Valley, Calif.

Filed Apr. 6, 1988, Ser. No. 178,106

Int. Cl.[4] H04N 9/74

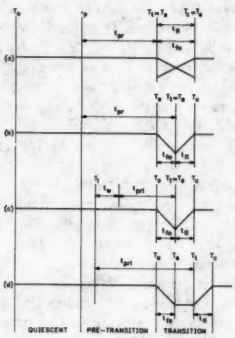
U.S. Cl. 358—181 **3 Claims**

1. A method of interrupting a transition from a current source on a program but to a next source on a preset bus

regardless of the time within the transition at which the interrupt occurs comprising the steps of:

in response to the interrupt selecting a new next source for placement on the preset bus and initiating necessary activation of the new next source;

reducing the current source to black;



switching the new next source to the program bus from the preset bus so that the new next source becomes a new current source; and

then bringing up the new current source on the program bus from black when the activation is complete.

4,890,164

IMAGE SENSOR HAVING CHARGE STORAGE REGIONS

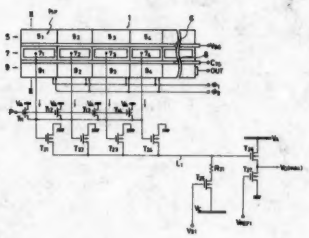
Akira Takei, Yokohama; Teruyuki Nabeta, Tokyo; Tetsuo Nishikawa, Kawasaki, and Eiichi Nagai, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Oct. 5, 1988, Ser. No. 253,646

Claims priority, application Japan, Oct. 9, 1987, 62-255678

Int. Cl.[4] H04N *3/14*

U.S. Cl. 358—213.19 **20 Claims**



1. An image sensor comprising:

a plurality of photodiodes;

a plurality of charge storage regions for storing charges from the respective photodiodes, the plurality of charge storage regions comprising respective floating electrodes, potentials of the floating electrodes varying in accordance with amounts of charges stored in the respective charge storage regions;

charge transferring means for transferring the charges from the plurality of charge storage regions in response to a predetermined transfer clock;

a plurality of potential monitoring means connected to the respective floating electrodes for separately monitoring changes in potential of the respective floating electrodes; and

output means for producing an output signal which varies in accordance with one of the monitored potentials, said one of the monitored potentials being one of either a highest potential or lowest potential.

4,890,165

IMAGE PICK-UP APPARATUS FOR PRODUCING VIDEO SIGNALS OF HIGH INFORMATION DENSITY IN TIME BASE DIRECTION

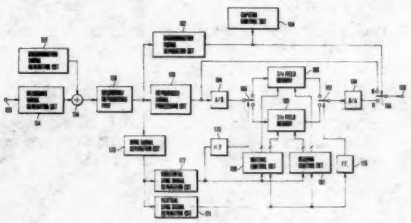
Masahide Hasegawa, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 4, 1988, Ser. No. 177,505

Claims priority, application Japan, Apr. 6, 1987, 62-084105; Apr. 6, 1987, 62-084107; Apr. 6, 1987, 62-084108; Jun. 10, 1987, 62-144724

Int. Cl.[4] H04N *3/14*

U.S. Cl. 358—213.26 **8 Claims**



1. An image pick-up apparatus comprising:

(a) image sensing means for converting an image of an object formed on an image sensing plane into an electrical video signal;

(b) synchronizing signal adding means for adding horizontal and vertical synchronizing signals to said video signal produced from said image sensing means;

(c) periodic signal generating means for generating a periodic signal of a frequency which is an n number (n: an integer being at least 2) times as high as a frequency of said vertical synchronizing signal; and

(d) scanning signal generating means for generating and supplying to said image sensing means a vertical scanning signal to cause a vertical scanning process to be performed on said image sensing plane in a cycle which is 1/n of a period of said vertical synchronizing signal on the basis of said periodic signal.

4,890,166

EXPOSURE CONTROL DEVICE IN AN ELECTRONIC STILL CAMERA

Keita Kimura; Norihiko Takatsu, both of Tokyo, and Tetsuya Yamamoto, Hasuda, all of Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Apr. 12, 1988, Ser. No. 180,848

Claims priority, application Japan, Apr. 20, 1987, 62-97138

Int. Cl.[4] H04N *5/238*

U.S. Cl. 358—228 **8 Claims**

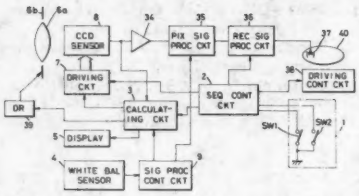
1. An electronic still camera having a photo-taking lens, image pickup means for accumulating therein charges according to the intensity distribution of the incident light from an object passed through said photo-taking lens, and recording means for recording the picture signal from said image pickup means on a recording medium, said electronic still camera including:

calculating means for calculating an exposure value of said image pickup means, said calculating means calculating a first exposure value for said image pickup means prior to

the operation of said image pickup means for producing the picture signal;

starting means for causing said image pickup means to start the production of the picture signal after the calculation of said first exposure value by said calculating means;

exposure control means for controlling the charge accumulating time of said image pickup means, said exposure control means being responsive to said starting means to



control the charge accumulating time of said image pickup means on the basis of said first exposure value, said calculating means calculating a second exposure value for said image pickup means on the basis of the picture signal from said image pickup means; and

driving control means for driving said image pickup means dependent upon a relationship between said first exposure value and said second exposure value.

4,890,167

APPARATUS FOR PROCESSING IMAGE SIGNAL

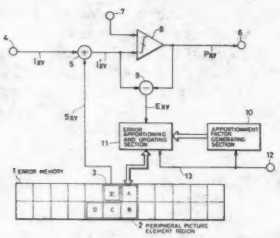
Katsuo Nakazato, Tokyo; Hiroyoshi Tsuchiya, Kawasaki; Toshiharu Kurosawa, Yokohama; Yuji Maruyama, Tokyo, and Kiyoshi Takahashi, Kawasaki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 16, 1987, Ser. No. 110,082

Claims priority, application Japan, Oct. 17, 1986, 61-247755; Oct. 17, 1986, 61-247756; Oct. 17, 1986, 61-247761; Dec. 19, 1986, 61-304245

Int. Cl.[4] H04N *1/40*

U.S. Cl. 358—443 **13 Claims**



1. An image signal processing apparatus for sampling an input signal representing a continuous tone image, in units of picture elements, to sequentially process the picture elements to produce a bi-level image signal, the apparatus comprising:

error memory means for storing accumulated errors at storage positions respectively corresponding to positions in said image of an object picture element and a plurality of picture elements which are positioned adjacent to the object picture element in said image;

input correction means for adding a level of said input signal, representing the density of said object picture element in said image, to an accumulated error which has been stored during a preceding processing step at said position within the error memory means corresponding to said object picture element, to derive a corrected level as a result of the addition;

bi-level conversion means for comparing said corrected level with a fixed threshold value to thereby determine a bi-level value for said object picture element, and for producing said bi-level value as said bi-level image signal;

difference computation means for deriving a bi-level conversion error which is the difference between said corrected level and said bi-level value determined for the object picture element;

apportionment factor generating means having a plurality of apportionment factors stored therein, for generating a set of apportionment factors by selection from among said stored plurality of factors; and

error apportionment and updating means for computing respective error apportionment values corresponding to said adjacent picture elements, based on said bi-level conversion error for said object picture element, and said plurality of apportionment factors, adding said error apportionment values to corresponding accumulated errors which have been previously stored in said error memory means at storage positions respectively corresponding to said adjacent picture elements, to thereby obtain updated accumulated errors, and storing said updated accumulated errors in said error memory means.

4,890,168

PROGRAM SCAN APPARATUS FOR VTR UTILIZING PICTURE-IN-PICTURE DISPLAY

Hajime Inoue, Kobe, and Mikio Tanaka, Daitou, both of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan

Filed May 19, 1988, Ser. No. 195,933

Claims priority, application Fed. Rep. of Germany, May 20, 1987, 123570

Int. Cl.[4] H04N *5/782*

U.S. Cl. 358—335 **8 Claims**

1. An index scan system in a video tape recorder for reproducing the contents recorded on a magnetic tape **(1)** having an index signal recorded in the starting position of each recorded program, comprising:

means **(21)** for setting an index scan mode,

means **(18, 23, 24)** responsive to setting of said index scan mode for traveling said magnetic tape at high speed in either one of a positive direction and a reverse direction,

means **(4, 17)** for detecting said index signal during the high-speed traveling of said magnetic tape,

means **(11, 18, 19)** for reproducing the starting portion of the recorded program in a short time period every time said index signal is detected,

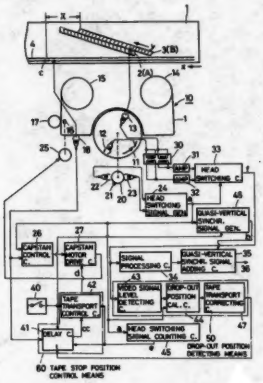
means **(30–43)** for forming a picture-in-picture screen by combining a main screen corresponding to a video signal received by a tuner contained in said video tape recorder with a subscreen corresponding to a video signal reproduced from said magnetic tape, and

output selecting means **(18, 34, 43, 44)** for selecting said received video signal during high-speed traveling of said magnetic tape to output the same while selecting an output of said picture-in-picture screen forming means during reproducing of said magnetic tape to output the same.

4,890,169
MAGNETIC TAPE RECORDING AND/OR REPRODUCING APPARATUS WITH SLOW MOTION EFFECT

Tetsuo Kobayashi, and Masaharu Hayakawa, both of Nagaokakyo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 24, 1987, Ser. No. 41,993
Claims priority, application Japan, Apr. 28, 1986, 61-100625
Int. Cl.[4] H04N 5/782
U.S. Cl. 360—10.3 **16 Claims**



1. A magnetically recorded information reproducing apparatus of a helical scan type which is capable of performing still picture reproduction and normal picture reproduction alternately by means of at least two head assemblies which are supported for rotation about a common axis while a length of magnetic tape having video signals recorded thereon is intermittently moved therepast, the apparatus comprising:

detecting means for detecting a noise position at which the level of the video signal being reproduced decreases to a value lower than a predetermined value when the length of magnetic tape is in stoppage, acceleration, and deceleration; and

control means for receiving an output signal from the detecting means during the stoppage and for controlling the timing, at which the subsequent interruption of movement of the length of magnetic tape is to be affected, thereby shifting the noise position into the period corresponding to the vertical synchronizing period, said control means receiving an output signal from the detecting means during the acceleration and advancing the timing by a predetermined time, and said control means receiving an output signal from the detecting means during the deceleration and delaying the timing by a predetermined time.

4,890,170
WAVEFORM EQUALIZATION CIRCUIT FOR A MAGNETIC REPRODUCING DEVICE

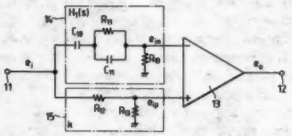
Haruyuki Inohana; Saburo Takaoka, both of Saitama, and Hideaki Takada, Saga, all of Japan, assignors to Pioneer Electronic Corporation and Hitachi, Ltd., both of Tokyo, Japan

Filed Aug. 22, 1988, Ser. No. 234,863
Claims priority, application Japan, Aug. 20, 1987, 62-205011
Int. Cl.[4] G11B 5/09
U.S. Cl. 360—65 **15 Claims**

1. A waveform equalization circuit comprising:

an amplifier having two input terminals, a non-inversion input terminal and an inversion input terminal;

a first network having a function characteristic represented by a function $H_1(s)$ defined by the following equation, through which a digital signal read by a magnetic head



from a magnetic medium is applied to a first one of said two input terminals of said amplifier:

$$H_1(s) = K \cdot \frac{(s+\sigma_1)(s-\sigma_2)}{(s+\sigma_3)(s \pm \sigma_4)} + k$$

where K and k are constants, and σ_1 through σ_4 are angular frequencies satisfying relations

$$\sigma_3 < \sigma_1 < \sigma_4, \text{ and } \sigma_3 < \sigma_2 < \sigma_4;$$

and

a second network having a transfer characteristic represented by a function $H_2(s)$ represented by the following equation, through which said digital signal is applied to a second one of said two input terminals of said amplifier:

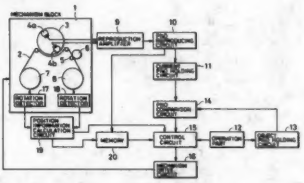
$$H_2(s) = k,$$

and means for outputting the digital signal thus subjected to waveform equalization.

4,890,171
HIGH SPEED INFORMATION RETRIEVAL APPARATUS

Tatsuro Nagao, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Apr. 20, 1988, Ser. No. 183,808
Claims priority, application Japan, Apr. 20, 1987, 62-58612[U]
Int. Cl.[4] G11B 15/46
U.S. Cl. 360—73.05 **4 Claims**



1. A high speed information retrieving apparatus, having a mechanism block containing a supply reel and a take-up reel carrying magnetic tape, said mechanism block being operative in at least a normal reproduction speed and a high search speed, which retrieves from the tape and reproduces desired information programs based on program numbers formed on the tape as subcode information recorded in locations corresponding to individual information programs also recorded on the magnetic tape, comprising:

rotation detector means for detecting rotation of at least one of the supply reel and take-up reel and providing rotation information;

position information calculation means for performing cal-

culations based on the rotation information sent from said rotation detector means for providing an indication of the current position of the magnetic tape;

program number reproducing means which reproduces programs numbers recorded on said magnetic tape; and

memory means for storing said program numbers obtained from the program number reproducing means and said corresponding position information provided by the position information calculation means;

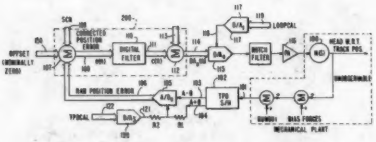
said retrieving apparatus being operative in the case where an object program number position is not stored in said memory means at the time of high speed search operation to control said mechanism block at a first high speed running mode, and operative in the case where an object program number position is stored in said memory means to control said mechanism block at a second high speed running mode, the speed in the second high speed running mode being higher than the speed in the first high speed running mode.

4,890,172

AUTOMATIC SERVO GAIN CALIBRATION SYSTEM FOR A DISK DRIVE

Charles R. Watt, Shrewsbury; Frederick K. Groll, Rutland, and John A. Scaramuzzo, Jr., Natick, all of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Sep. 27, 1988, Ser. No. 250,037
Int. Cl.[4] G11B *33/00*
U.S. Cl. 360—77.04 **11 Claims**



8. A method for automatically calibrating gain parameters of a servo control for a computer disk drive device, the servo control including embedded servo information, the method comprising the steps of:

determining a servo bandwidth frequency of the disk drive device;

measuring a noise signal in the servo control, the noise signal having a frequency equal to the servo bandwidth frequency;

performing a digital signal processing technique to complexly subtract the noise signal from correction signal information obtained at an open loop gain junction at the servo bandwidth frequency;

performing a Bode plot analysis of gain versus frequency of the servo control after the step of complex subtraction; and

adjusting the gain of the servo control until the gain of the servo control at the servo bandwidth frequency equals zero dB in the Bode plot.

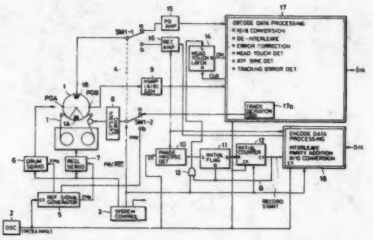
4,890,173

DIGITAL SIGNAL REPRODUCING APPARATUS WITH CAPSTAN SERVO CONTROL BASED ON ADJACENT TRACK PILOT SIGNAL CROSSTALK ADJUSTMENT

Seiichi Yokozawa, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jul. 13, 1987, Ser. No. 72,822
Claims priority, application Japan, Jul. 11, 1986, 61-162086
Int. Cl.[4] G11B *5/584, 5/09, 15/467*
U.S. Cl. 360—77.15 **7 Claims**

1. In a digital signal reproducing apparatus having at least two rotary heads for reproducing a plurality of signals on a recording medium, said plurality of signals containing a digital signal formed by performing pulse-code modulation (PCM) and time-base compression on an audio signal and a tracking pilot signal composed of a frequency signal with a small azimuth loss, said plurality of signals being recorded on each of a plurality of helical tracks in a predetermined format with respective recording regions of said plurality of signals in each track being independent of one another in a track direction, a position of the pilot signals recorded on any three consecutive tracks differing from each other, each of said rotary heads having a width greater than the width of each track on which it scans, and a capstan servo being controlled by a difference between levels of crosstalk of the pilot signals that are picked up by said rotary heads from two tracks adjacent to a track being scanned and reproduced by a first of said rotary heads, the improvement comprising:



means for sampling and holding a level of the pilot signal that is picked up by the rotary heads from the track being scanned; and

level adjusting means for adjusting a difference between levels of crosstalk of pilot signals from said two adjacent tracks with reference to said level;

means for sampling the levels of crosstalk from at least one of the adjacent tracks;

means for determining whether said levels of crosstalk sampled by said sampling means have been sampled correctly; and

output means responsive to said determining means for thereafter outputting the adjusted level difference, which is used as a reference for performing control on the capstan servo.

4,890,174

ROTARY VOICE COIL MICRO-HARD DISK DRIVE SYSTEM

Brian D. Chalmers; Colin A. Mackenzie, and Kishore K. Kapoor, all of Fife, Scotland, assignors to Rodime PLC, United Kingdom

Continuation of Ser. No. 854,949, Apr. 23, 1986, abandoned. This application Mar. 18, 1987, Ser. No. 29,056
Int. Cl.[4] G11B *5/55, 21/08*
U.S. Cl. 360—78.12 **14 Claims**

1. A computer disk drive system for operating a micro-hard disk, said drive system being contained within a 3½ inch Winchester drive form factor, comprising:

at least three micro-hard disks each having a plurality of tracks;

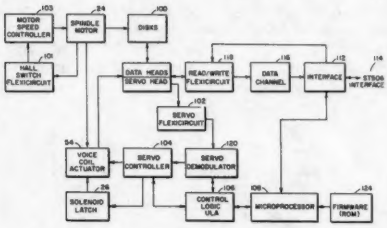
means including a motor for rotating and rotatably supporting said at least three micro-hard disks;

transducer means for writing digital information on and reading digital information from said at least three micro-hard disks;

rotary voice coil positioning means for moving said transducer means between said tracks on said at least three hard disks to provide and average seek time of approximately 30 millisecond or less;

two clamshell-shaped upper and lower housing members

forming a housing in which said transducer means, said rotary voice coil positioning means and said motor are contained; and



an inner portion of said motor, about which a rotatable portion of said motor rotates, is fixedly secured to both of said upper and lower housing members so that said inner portion does not move relative to both of said upper and lower housing members.

4,890,175

RECORDING MEDIUM MOUNTING MEANS AND RECORDING OR REPRODUCING APPARATUS INCORPORATING SAME

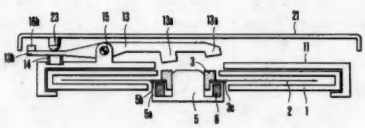
Nobuo Tezuka, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 846,594, Mar. 31, 1986, abandoned. This application Nov. 21, 1988, Ser. No. 274,670

Claims priority, application Japan, Apr. 1, 1985, 60-068740; Jul. 4, 1985, 60-148110

Int. Cl.[4] G11B *17/04*

U.S. Cl. 360—97.01 **19 Claims**



1. An apparatus for recording information on or reproducing information from a recording medium, the recording medium having a mounting part for mounting the medium to the apparatus, the apparatus comprising:

holder means for receiving and housing the recording medium and being movable to position said medium in a predetermined recording or reproducing position;

cover means which is movable to a given position adjacent said holder means, said cover means being arranged outside said holder means;

rotating means for rotating said recording medium positioned in said predetermined recording or reproducing position by said holder means;

pressing means arranged at said holder means for mounting said recording medium onto said rotating means by pressing the mounting part of said recording medium, said pressing means being arranged to operate to press said recording medium to said rotating means, depending upon a movement of said holder means in one direction from its opening position to its closing position;

release means which is arranged to cancel the press fit mounting state of said pressing means when said cover means moves to said predetermined position to cover said holder means; and

means for recording information or reproducing information from the recording medium as said recording medium is driven by said rotating means.

4,890,176

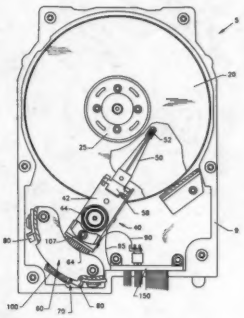
CRASH STOP AND MAGNETIC LATCH FOR A VOICE COIL ACTUATOR

Shawn E. Casey, San Jose, and Terence H. West, Aptos, both of Calif., assignors to Seagate Technology, Inc., Scotts Valley, Calif.

Filed Jul. 18, 1988, Ser. No. 220,329

Int. Cl.[4] G11B *21/22*

U.S. Cl. 360—105 **5 Claims**



1. A magnetic latch for a disc drive system having a head positioner assembly for positioning a plurality of transducer heads relative to a recording media located within a disc housing, the head positioner assembly being movable with respect to the disc housing, the magnetic latch including:

a bumper stop fixably mounted to the housing for limiting the head positioner assembly's movement in one direction;

a strike plate carried by the head positioner assembly that is formed of a magnetic material; and

magnet means mounted to the bumper stop for magnetically engaging the strike plate to latch the head positioner assembly against the bumper stop when the drive is not in use, the magnet means including a slidable element that is slidably coupled to the bumper stop to insure that the magnet means firmly engages the strike plate.

4,890,177

GUIDE DRUM ASSEMBLY WITH BUILT-IN MOTOR HAVING FLOATING ROTOR

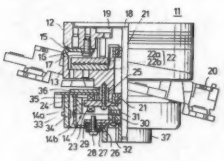
Hiroshi Katoh, Chigasaki; Hiromi Taguchi, Yokohama, and Shoji Kikunaga, Tokyo, all of Japan, assignors to Victor Company of Japan, Ltd., Kanagawa, Japan

Filed Mar. 11, 1988, Ser. No. 166,566

Claims priority, application Japan, Mar. 13, 1987, 62-59660

Int. Cl.[4] G11B *5/52, 21/04*

U.S. Cl. 360—107 **12 Claims**



1. A guide drum assembly comprising:

a rotary drum mounted with at least one rotary magnetic head;

a stationary drum arranged coaxially with said rotary drum confronted thereby;

a rotary shaft rigidly and directly fixed to a center portion of

said rotary drum so that said rotary drum rotates when said rotary shaft rotates;

a built-in motor incorporated in said guide drum assembly and having a stator which is fixed to said stationary drum and a rotor which is coaxial with said rotary shaft and generates a torque for driving said rotary shaft; and

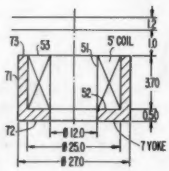
a resilient member having both viscosity and elasticity and being interposed between said rotor and said rotary shaft so that said rotor is coupled to said rotary shaft and is displaceable with respect to said rotary shaft in a circumferential direction of said rotary shaft, said torque being transferred to said rotary shaft through said resilient member.

4,890,178

MAGNETIC BIAS COIL FOR A MAGNETO-OPTICAL RECORDING APPARATUS

Junichi Ichihara, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Mar. 31, 1988, Ser. No. 176,275
Claims priority, application Japan, Apr. 10, 1987, 62-55202
Int. Cl.[4] G11B *5/127, 7/00*
U.S. Cl. 360—114 **3 Claims**



1. A magneto-optical apparatus for recording data on a recording disk including a perpendicular magnetic anisotropic materiai comprising:

electromagnetic bias coil means having an outer perimeter surface and a bottom surface, for receiving a first current and for applying a first magnetic field to a region of said perpendicular magnetic anisotropic material, said first magnetic field being perpendicular to a surface of said recording disk;

optical means, positioned essentially coaxially with respect to said electromagnetic bias coil means, for receiving and focusing a light beam onto said region; and

magnetic yoke means, having an L-shaped cross-section and comprising a soft magnetic material and positioned about said outer perimeter surface and said bottom surface, for increasing the first magnetic field applied to said region in response to said first current.

4,890,179

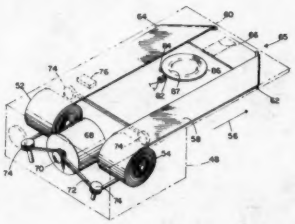
MAGNETIC TAPE BACKUP DEVICE FOR USE WITH A FLOPPY DISK DRIVE

James W. Baker, 2500 Sixth Ave. N., Suite 3, Seattle, Wash. 98109

Continuation of Ser. No. 19,886, Feb. 27, 1987, abandoned. This application Nov. 18, 1988, Ser. No. 273,659
Int. Cl.[4] G11B *23/02*
U.S. Cl. 360—132 **5 Claims**

1. A tape backup device for receiving data through a disk drive that is adapted to receive a substantially planar magnetic data storage disk in an elongated slot, the disk drive having a drive mechanism for rotating the disk and a magnetic read/write head that is oriented to be adjacent and substantially parallel to a received planar magnetic data storage disk and adapted to transfer data to and from the disk, the backup device comprising:

a housing having integral lip and storage portions, the lip portion having a shape allowing the lip portion to be inserted into the slot of the disk drive, and further having an aperture that is aligned with and parallel to the read/write head of the disk drive when the lip portion is inserted into the disk drive, the storage portion being positioned outside of the disk drive when the housing is inserted into the disk drive and containing a supply of magnetic recording tape, a length of magnetic recording tape from the supply of magnetic recording tape passing into



the lip portion from the storage portion and passing adjacent and substantially parallel to the aperture; and

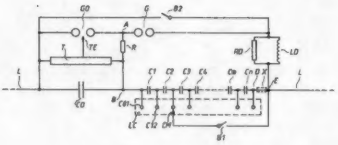
a tape drive means including an electric motor contained within the housing for causing the tape from the supply of magnetic recording tape to move adjacent to the aperture and parallel to the read/write head of the disk drive when the lip portion of the housing is inserted into the disk drive.

4,890,180

SERIES CAPACITOR EQUIPMENT

Lars Paulsson, Västerås, Sweden, assignor to Asea Brown Boveri AB, Västerås, Sweden

Filed Oct. 3, 1988, Ser. No. 252,338
Claims priority, application Sweden, Oct. 2, 1987, 8703806
Int. Cl.[4] H02H *7/16*
U.S. Cl. 361—16 **8 Claims**



1. An overvoltage protection circuit for series capacitor equipment with a capacitor bank for connection into an electric power transmission line for control of the power line, wherein the capacitor bank has a first part with a fixed capacitance and a second part with a controllable capacitance, the second part being connected in series with the frist part, said protection circuit, comprising:

a first spark gap protective means connected across the first part of the capacitor bank and including a spark gap;

a second, spark gap protective means including a spark gap connected in series with said spark gap of said first gap protective means; and

an impedance element interconnected between the point of connection of the two spark gaps and the point of connection of the two capacitor bank parts;

wherein, said first spark gap protective means is ignited at a predetermined level of current in the power transmission line, and said second spark gap protective means is ignited responsive to the ignition of said first spark gap protective means by the voltage drop across said impedance element,

and the voltage drop across said second part of the capacitor bank.

4,890,181

SHORT-CIRCUIT PROTECTION DEVICE FOR AN ELECTRICAL MACHINE FED BY A PULSE-CONTROLLED A.C. CONVERTER

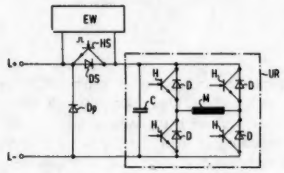
Georg Nerowski, Lauf; Bernhard Piepenbreier, Hemhofen, and Hans-Juergen Toelle, Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Mar. 8, 1989, Ser. No. 320,394

Claims priority, application Fed. Rep. of Germany, Mar. 18, 1988, 3809203

Int. Cl.[4] H02H *7/08*

U.S. Cl. 361—18 **2 Claims**



1. A short-circuit protection device for an electrical machine fed by a pulse-controlled a.c. converter coupled to d.c. current supply lines to a d.c. current power supply, the a.c. converter being operative in all four quadrants of a performance graph of speed of rotation - moment of rotation, said a.c. converter having an intermediate circuit capacitor and recovery diodes, said protection device comprising:

a poled protection diode that is permeable only to motor machine current from the d.c. current power supply;

a controllable power semiconductor, permeable only to generator machine current from the machine, said poled protection diode and said controllable power semiconductor being arranged in at least one of said d.c. current supply lines; and

a short-circuit detector coupled to said controllable power semiconductor which detects a short circuit in the d.c. current power supply and controls a switching off of said controllable power semiconductor, whereby the intermediate circuit capacitor of the a.c. converter is isolated from the location of the short-circuit in the d.c current supply line and the voltage of said intermediate circuit capacitor prevents a machine short-circuit current in the recovery diodes of the a.c. converter.

4,890,182

CIRCUIT PROTECTION DEVICE

Martin Sweet, Swindon, England, assignor to Raychem Limited, England

Continuation of Ser. No. 99,947, Sep. 23, 1987, abandoned. This application Aug. 31, 1988, Ser. No. 239,075

Claims priority, application United Kingdom, Sep. 26, 1986, 8623177

Int. Cl.[4] H02H *9/04*

U.S. Cl. 361—56 **7 Claims**

1. A circuit protection device for protecting an electrical circuit from a voltage transient which comprises:

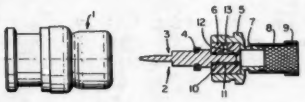
a threshold switching element that will change from a high resistance state to a low resistance state on application of a voltage, but will remain in its low resistance state only for as long as a small holding current is maintained through the element, the switching element being formed from an amorphous composition comprising:

(a) from 5 to 40 atomic percent germanium;

(b) from 40 to 90 atomic percent sulfur; and

(c) up to 40 atomic percent antimony;

in which the proportions of (a), (b) and (c) (based on the total molar quantity of (a), (b) and (c)) add up to the



composition having not more than 10 atomic percent tellurium (based on the total molar quantity of the composition);

and a pair of electrodes in contact with the composition.

4,890,183

DEVICE FOR DETECTING CUTOFF AND SHORT CIRCUIT DEFECTS IN AT LEAST ONE ELECTRICAL CIRCUIT PORTION

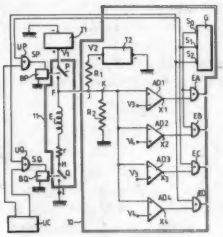
Robert Champiau, Villemoisson sur Orge, France, assignor to Bull S.A., Paris, France

Filed May 2, 1989, Ser. No. 346,213

Claims priority, application France, May 4, 1988, 88 06003

Int. Cl.[4] H02H *3/00*

U.S. Cl. 361—86 **21 Claims**



1. A detecting device for detecting cutoffs and short circuit defects occurring in at least one electrical circuit portion (11) having at least one passive, non-capacitive element (E) including a first end (F) and a second end (H), a first switch device (P) mounted between said first end (F) and a first terminal of a first source of direct voltage (T1), and a second switch device (Q) mounted between said second end (H) and a second terminal of said voltage source (T1), said detecting device comprising discriminator circuit means (AD1, AD2, AD3, AD4), having an input (K) connected to said first end (F) and four outputs (X1, X2, X3, X4), and operatively arranged for furnishing a different configuration of signals at its outputs, depending on whether each of the two parts of the circuit portion located on either side of said first end (F) have a cutoff defect or a short-circuit defect, consecutive to the actuation of the two switch devices (P and Q).

4,890,184

MOLDED CASE CIRCUIT BREAKER ACTUATOR-ACCESSORY UNIT

Ronald R. Russell, 46 Metacomet Rd., Plainville, Conn. 06062

Filed Dec. 30, 1988, Ser. No. 292,074

Int. Cl.[4] H02H *3/24*

U.S. Cl. 361—87 **12 Claims**

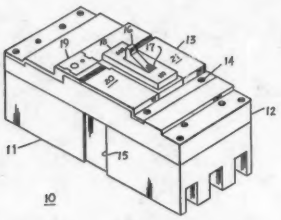
1. A circuit breaker actuator-accessory unit circuit comprising:

an undervoltage release electromagnetic coil;

a spring-biased plunger associated with said coil;

an undervoltage control circuit connected with said coil, said undervoltage circuit including means for interrupting holding current to said coil and allowing said plunger to propel into contact with a trip lever upon receipt of a predetermined undervoltage signal to said undervoltage circuit;

an overcurrent control circuit interacting with said undervoltage circuit, said overcurrent circuit including means for interrupting said holding current upon receipt of a



predetermined overcurrent signal to said overcurrent circuit; and

a solid state switch interconnecting said undervoltage control circuit and said overcurrent control circuit with said electromagnetic coil for providing a first impedance to said electromagnetic coil in the absence of said predetermined overcurrent signal and a second impedance to said electromagnetic coil upon occurrence of said predetermined overcurrent signal, said second impedance being greater than said first impedance.

4,890,185

CIRCUIT FOR PROTECTING A SWITCHING TRANSISTOR

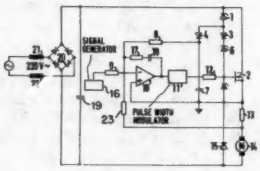
Heinz-Dietmar Karl; Manfred Tinebor, both of Barntrup, and Josef Lackhove, Aerzen, all of Fed. Rep. of Germany, assignors to Lenze GmbH & Co. KG Aerzen, Arezen, Fed. Rep. of Germany

Filed Dec. 13, 1988, Ser. No. 283,741

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3743866

Int. Cl.[4] H02H *3/20*

U.S. Cl. 361—91 **7 Claims**



1. A circuit for protecting a switching transistor connected between a direct-current voltage source and an inductive load, the circuit comprising:

a voltage-limiting element connected between the source and the transistor for switching the transistor when the voltage of the source exceeds a predetermined limit;

means for deriving from the voltage-limiting element a control signal when the source voltage exceeds the predetermined limit; and

a variable pulse-width modulator connected to a control input of the transistor and receiving the signal from the means, the modulator decreasing pulse width when the source voltage exceeds the limit.

4,890,186

FAULT CURRENT LIMITING DEVICE

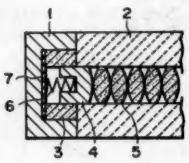
Chiaki Matsubara; Hirokuni Ishikawa, and Masao Ojima, all of Kitakyushu, Japan, assignors to Kabushiki Kaisha Yaskawa Denki Seisakusho, Fukuoka, Japan

Filed Feb. 14, 1989, Ser. No. 310,673

Claims priority, application Japan, Mar. 2, 1988, 63-47524

Int. Cl.[4] H02H *5/04*

U.S. Cl. 361—103 **16 Claims**



1. A fault current limiting device a tubular vessel formed from an insulated body, electrodes formed of a conductive material provided on opposite ends of said tubular vessel, and materials sublimated at a high temperature provided within said tubular vessel and accommodated while being placed in contact with each other so as to provide an electric conduction from one electrode to the other.

4,890,187

INTEGRATED CIRCUIT PROTECTED AGAINST ELECTROSTATIC DISCHARGES, WITH VARIABLE PROTECTION THRESHOLD

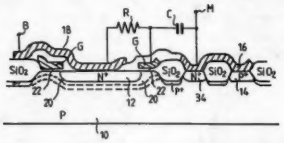
Francois Tailliet, Epinay sur Seine, and Jacek Kowalski, Trets, both of France, assignors to SGS-Thomson Microelectronics, SA, Gentilly, France

Filed Oct. 28, 1988, Ser. No. 264,202

Claims priority, application France, Nov. 6, 1987, 87 15405

Int. Cl.[4] H02H *9/04*

U.S. Cl. 361—111 **5 Claims**



1. An integrated circuit comprising at least a terminal to be protected and a reference terminal, and means for protecting the integrated circuit against overvoltages, said protecting means comprising

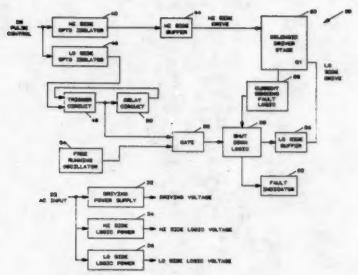
a diode connected between said terminals, said diode capable of being set in avalanche conduction in case an overvoltage is applied between said terminals in a direction corresponding to a reverse bias of the diode,

means for modifying the distribution of equipotential lines in a region where the avalanche conduction of the diode starts, said means connected to said terminal to be protected, and said means being sensitive to the rising slope of the overvoltage, in such a way that the avalanche triggering voltage is lower when the slope is steeper, and higher when the slope is less steep.

4,890,188
SOLENOID DRIVER SYSTEM

Gary Russell, Pacific Grove, and Walter J. Kozacky, San Jose, both of Calif., assignors to Lockwood Technical, Inc., Sand City, Calif.

Filed Oct. 4, 1988, Ser. No. 252,980
Int. Cl.[4] H01H *47/22, 47/32*
U.S. Cl. 361—154 **20 Claims**



1. Solenoid driver system for rapid turn on of a solenoid coil and low power energization of the solenoid coil after turn on comprising:

a. driving power supply, a high side logic power supply and a low side logic power supply, all connected to an A.C input;

b. a high side optical isolator and a low side optical isolator connected to a control pulse input;

c. a high side buffer connected to said high side optical isolator;

d. a solenoid driver connected to said high side buffer and outputting a solenoid power drive signal;

e. a trigger circuit connected between a gate and said low side optical isolator, a delay circuit connected from an output of said trigger circuit to an input of said trigger circuit and a free-running oscillator connected to said gate; and,

f. a low side buffer connected between said solenoid driver stage and said gate whereby said solenoid driver system provides a first maximum current flow for solenoid coil turn on and a second minimal current flow for solenoid coil operation.

4,890,189
LIGHTNING PROTECTIVE DEVICE FOR MOBILE RADAR ANTENNA

Deville Geneviéve, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Feb. 25, 1988, Ser. No. 160,404
Claims priority, application France, Mar. 6, 1987, 87 03070
Int. Cl.[4] H02H *3/22*
U.S. Cl. 361—222 **19 Claims**

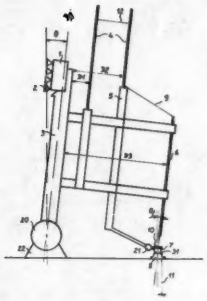
11. A lightning protective device for a ground based rotating radar antenna which rotates around a substantially vertical axis, said device comprising:

at least one electrically conductive rod, located near said antenna and placed outside the transmission and reception sector of said antenna, a first end of said rod being higher than said antenna,

an electrically insulating rigid support for transmitting the rotation of said antenna to said rod, and for keeping said rod outside the transmission and reception sector of said antenna,

electrically conductive elements comprising a first part which is connected to an end of said rod which is opposite to its first end, said rigid support further providing for a transmission of the rotation of said antenna to said conductive elements,

a fixed electrically conductive circular rail, said conductive elements further comprising a second part which rubs



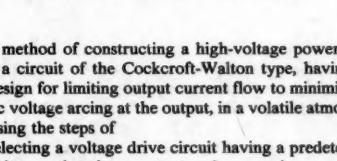
against said circular rail thus providing for an electrical connection between said conductive elements and said circular rail, and

fixed charge removal means electrically connected to said circular rail.

4,890,190
METHOD OF SELECTING OPTIMUM SERIES LIMITING RESISTANCE FOR HIGH VOLTAGE CONTROL CIRCUIT

Dale R. Hemming, Fridley, Minn., assignor to Graco Inc., Minneapolis, Minn.

Filed Dec. 9, 1988, Ser. No. 281,651
Int. Cl.[4] B05B *5/02*
U.S. Cl. 361—235 **2 Claims**



1. A method of constructing a high-voltage power supply having a circuit of the Cockcroft-Walton type, having optimum design for limiting output current flow to minimize electrostatic voltage arcing at the output, in a volatile atmosphere, comprising the steps of

(a) selecting a voltage drive circuit having a predetermined peak-to-peak voltage output and connecting same to the input of said Cockcroft-Walton circuit;

(b) selecting a predetermined number of voltage multiplication stages for said Cockcroft-Walton circuit; and

(c) connecting a resistor in series with the output of said Cockcroft-Walton circuit, said resistor having a value determined by

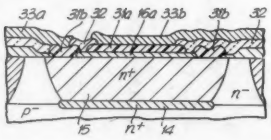
(i) dividing the predetermined peak-to-peak voltage by 2.4×10^{-3}, and

(ii) multiplying the result of step i) by one less than 4 times the predetermined number of voltage multiplication stages.

4,890,191
INTEGRATED CIRCUITS

George H. S. Rokos, Bishop's Stortford, Great Britain, assignor to STC PLC, London, England

Filed Jan. 31, 1989, Ser. No. 304,421
Claims priority, application United Kingdom, Feb. 23, 1988, 8804178
Int. Cl.[4] H01L 7/36, 27/02
U.S. Cl. 361—313 1 Claim

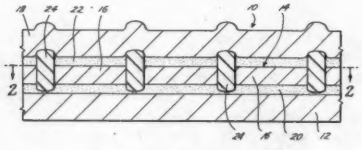


1. In an integrated circuitg a conductor cross-over structure including:
(a) a p^--type silicon substrate;
(b) an n^--type epitaxial layer disposed on the substrate;
(c) a buried n^--type region extending through the epitaxial layer and the substrate;
(d) an n^+-type region extending through the epitaxial layer and providing electrical contact to the buried layer;
(e) an oxide layer disposed on the epitaxial layer having spaced openings each exposing a portion of the n^+-type region;
(f) a polysilicon layer applied to the oxide layer and contacting the n^+-type region via the windows;
(g) an insulator layer applied to a polysilicon layer and having spaced openings each exposing a portion of the polysilicon layer; and
(h) a patterned metallisation layer providing a conductor track and contacts to the polysilicon layer via said openings in the insulator layer;
wherein said conductor track provides a first current path of the cross-over, and wherein the parallel combination of the polysilicon layer, the n^+-type region and the n^+-type buried layer provides a second current path of the cross-over.

4,890,192
THIN FILM CAPACITOR

Lawrence N. Smith, Austin, Tex., assignor to Microelectronics and Computer Technology Corporation, Austin, Tex.

Filed Apr. 9, 1987, Ser. No. 36,398
Int. Cl.[4] H01G 1/01; H01L 27/00
U.S. Cl. 361—313 9 Claims

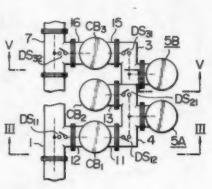


1. An integrated thin film capacitor comprising,
first, second and third metallic conductor layers,
said first and second layer separated by a first insulator layer,
said second and third layers separated by a second insulator layer,
said second conductors positioned between said first and third conductors and being a plurality of separated conductors separated by insulators, and
said first and third layers each forming an electrical connection to the capacitor and the first, second and third conductors forming a plurality of series connected capacitors, which series connected capacitors are connected in parallel.

4,890,193
GAS-INSULATED SWITCHGEAR EQUIPMENT

Tohru Tsubaki, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 8, 1988, Ser. No. 203,764
Claims priority, application Japan, Jun. 11, 1987, 62-144021
Int. Cl.[4] H02B 1/20
U.S. Cl. 361—341 5 Claims

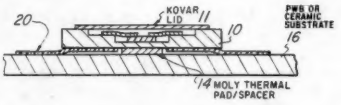


1. A gas insulated switchgear apparatus in which at least three vertical type gas insulated circuit breakers are arranged in a substantially straight line so as to make one set, said three circuit breakers being electrically connected in series connection by two connecting bus bars so that respective ones of said circuit breakers electrically located at both ends of said series connection are connected to at least one main bus bar and a plurality of outside led-out devices are respectively connected to said two connecting bus bars, each of said circuit breakers having an upper portion and a lower portion with a first led-out portion extending from a terminal of the upper portion and a second led-out portion extending from a terminal of the lower portion, each of said first and second led-out portions extending in a direction perpendicular to a direction of said straight line, said two connecting bus bars and said plurality of outside led-out devices connected to said two connecting bus bars being disposed on one side of said set of circuit breakers and said at least one main bus bar extending in the same direction as said straight line and being disposed on the other side of said set of circuit breakers, said plurality of outside led-out devices being respectively disposed between adjacent ones of said circuit breakers connected by said connecting bus bars.

4,890,194
A CHIP CARRIER AND MOUNTING STRUCTURE CONNECTED TO THE CHIP CARRIER

Lesli A. Derryberry, and Charles E. Williams, both of Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 801,038, Nov. 22, 1985, Pat. No. 4,750,089. This application Feb. 28, 1987, Ser. No. 161,572
The portion of the term of this patent subsequent to Jun. 7, 2005, has been disclaimed.
Int. Cl.[4] H05K 7/20, 5/06
U.S. Cl. 361—386 19 Claims



1. A chip carrier suitable for mounting to a circuit board comprising:
a chip carrier comprising a body and a lid sealed together to

define a totally enclosed cavity therebetween, said cavity containing at least one integrated circuit chip;

a spacer block attached to the underside of said chip carrier, said spacer block being smaller in area than the underside of said chip carrier;

a plurality of external contact pads around the perimeter of the underside of said chip carrier; and

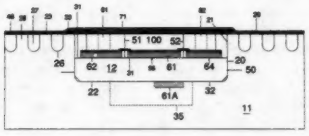
a connecting strip having a plurality of metallic traces thereon, said metallic traces having one end connected to said plurality of external contact pads and a second end suitable for attachment to said circuit board.

4,890,195

REPLACEABLE MMIC CHIP CARRIER CAPTURED BY DIFFERENTIAL THERMAL EXPANSION BETWEEN CARRIER AND SUPPORT HOUSING

Douglas E. Heckaman, Indialantic; Gilbert R. Perkins, and Roger H. Higman, both of Palm Bay, all of Fla., assignors to Harris Corporation, Melbourne, Fla.

Filed Feb. 8, 1988, Ser. No. 153,050
Int. Cl.[4] H05K 7/20, 7/02
U.S. Cl. 361—386 **26 Claims**



15. A packaging arrangement for a circuit component carrier comprising:

an electrically and thermally conductive support structure having a circuit component carrier receiving portion that is sizes to accept a circuit component carrier, said support structure containing material having a first coefficient of thermal expansion;

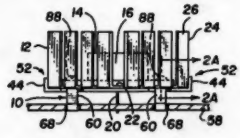
a circuit component carrier containing electrically thermally conductive material having a second coefficient of thermal expansion, different from said first coefficient of thermal expansion, inserted into the circuit component carrier receiving portion of said support structure and retained in electrical and thermal communication with said support structure by a compressive force acting against said circuit component carrier in response to the difference between said first and second coefficients of thermal expansion.

4,890,196

SOLDERABLE HEAT SINK FASTENER

Howard G. Hinshaw, Dallas, Tex., assignor to Thermalloy Incorporated, Dallas, Tex.

Continuation of Ser. No. 842,988, Mar. 24, 1986, abandoned. This application Dec. 9, 1987, Ser. No. 130,309
Int. Cl.[4] H05K 7/20
U.S. Cl. 361—388 **18 Claims**



1. Apparatus for mounting a heat sink and an electronic device package on a circuit board comprising:

(a) a substantially flat unitary body having a first face lying in a first plane and a second oppositely disposed face lying in a second plane and at least one aperture therein adapted for alignment with an aperture in a heat sink positioned adjacent said first face and adapted for attachment to said heat sink by screw means passing through both said apertures; and

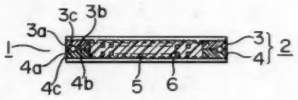
(b) solderable attachment means depending from said body in the direction substantially perpendicular to and opposite said first face and adapted to attach said body to a circuit board with said second face spaced from and substantially parallel with a surface of said circuit board.

4,890,197

MEMORY CARD HOUSING

Toshinobu Banjo; Yasuhiro Murasawa, and Shigeo Onoda, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Mar. 30, 1988, Ser. No. 175,212
Claims priority, application Japan, Mar. 31, 1987, 62-79921
Int. Cl.[4] H05K 7/00
U.S. Cl. 361—392 **5 Claims**



1. A memory card housing for housing a semiconductor device comprising:

an electrical connector for electrically connecting a semiconductor device disposed within the housing to an external device; and

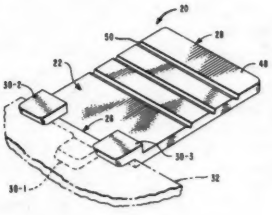
an outer package for housing the semiconductor device and retaining said electrical connector, said outer package comprising a plurality of package sections stacked atop and bonded to one another, each package section having a substantially planar peripheral connecting surface, the connecting surface of one package section being bonded to the connecting surface of the adjoining package section, at least one of the bonded connecting surfaces including an overflow groove formed along the periphery thereof for receiving a bonding agent.

4,890,198

PROCESS AND APPARATUS FOR RETAINING A CIRCUIT BOARD IN A MOUNTED POSITION IN A COMPUTER HOUSING

Don E. Beam, and Harold J. Sampson, both of Cambridge, Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed May 1, 1989, Ser. No. 347,115
Int. Cl.[4] H05K 7/14
U.S. Cl. 361—399 **11 Claims**



1. A retainer for retaining a circuit board in a mounted position in a housing of an electronic device; said retainer comprising:

a body having a length and also having first and second end portions;

a securing means for securing said first end portion to the circuit board; and

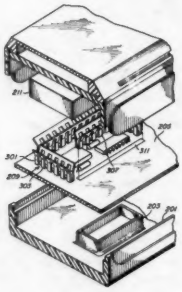
said second end portion including an adjusting means for adjusting said length of said body to attain a working length so that when said first end portion is secured to the circuit board and the circuit board is mounted in the housing, said second end is positioned to engage the housing and retains the circuit board in the mounted position.

4,890,199

MINIATURE SHIELD WITH OPPOSING CANTILEVER SPRING FINGERS

Scott D. Beutler, Hoffman Estates, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 4, 1988, Ser. No. 267,419
Int. Cl.[4] H05K *9/00*
U.S. Cl. 361—424 **6 Claims**



4. A portable radiotelephone having a housing with a conductive material covering at least a portion of the inside surface of the housing and having electronic circuitry substantially enclosed in the housing, comprising:

a substrate with the circuitry thereon disposed within the housing:

an essentially "U"-shaped conductive channel further comprising:

a plurality of pairs of opposing cantilever spring fingers attached to an elongated planar common base,

a first spring finger of said plurality of pairs of opposing cantilever spring fingers extending away from the plane of said base at a first obtuse angle and an opposing second spring finger of said plurality of pairs of opposing cantilever spring fingers extending away from the plane of said base at a second obtuse angle, such that said first and said opposing second spring fingers approach each other,

each said first and said opposing second of said pairs of spring fingers further having an end portion extending in a direction away from said opposing second and said first spring finger respectively;

a raised conductive wall portion disposed on the inside surface of the housing and further disposed between each said first and said opposing second of said pairs of spring fingers; and

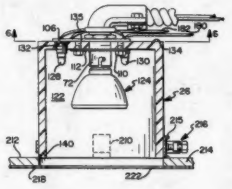
a conductive area disposed on said substrate essentially opposite said raised conductive wall and to which said "U"-shaped conductive channel is electrically connected.

4,890,200

DOWN LIGHTING SYSTEMS AND FIXTURES THEREFOR

Robert R. Mandy, 32750 Bingham La., Birmingham, Mich. 48010

Filed May 9, 1988, Ser. No. 191,423
Int. Cl.[4] F21V *19/04*
U.S. Cl. 362—20 **1 Claim**



1. A light system for providing emergency lighting and regular illumination comprising:

a housing including an open end and a closed end;

the open end having a flange extending outwardly of said housing to permit insertion of the housing through the access hole and defining a retention surface engageable with the outer surface of the ceiling when the fixture is mounted on the ceiling to interlock the fixture and the outer surface of the ceiling;

means connected to said closed end of the housing including a low profile conduit fitting that provides for connection of wires from a flexible conduit to socket means located inboard of said housing;

first socket means connected inboard of the housing for connecting a first primary source of illumination to the wires for directing regular illumination to a space below said ceiling;

second socket means connected inboard of the housing at a point offset from a vertical axis through said first socket means for connecting a secondary source of illumination to an emergency power source for directing emergency lighting from the open end of said housing so as to provide an emergency source of illumination in the space below said ceiling because of main power failure in the source of electrical power connected to said wires; and

circuit means for connecting the second socket means to a source of emergency power when the power supply for the first primary source of illumination fails;

said circuit means including a battery defining a rechargeable d.c. power source for emergency power, a battery charger having input terminals connected to the primary power source and outlet terminals for supplying charging current to said battery;

a double pole, double throw relay having a first pair of contacts and a second pair of contacts; a movable armature means operatively connected to said first and second pair of contacts, a coil energized by the primary power source to attract said armature to position said first pair of contacts to supply charging current to said battery when the primary power source is on;

spring means operative to position said armature means when said primary power source fails to condition said first pair of contacts to interrupt the charging current circuit and to condition said second pair of contacts to direct current from said battery to said second socket means so as to energize lamp means therein to provide emergency lighting; and

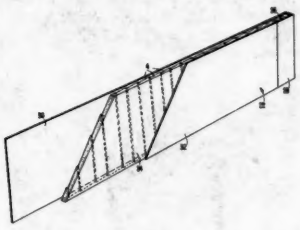
an emergency test button connected to said armature and manually operative for overcoming the force of the coil on said armature means and to connect the secondary source of illumination to the battery for testing emergency lighting when the main power is on.

4,890,201

LIGHT TRANSMITTING PLATE MEMBER

Nils Toft, Copenhagen, Denmark, assignor to Generaldirektoratet for Danske Statsbaner, DSB, and Jens Moller-Jensen, Copenhagen, Denmark

Filed Dec. 22, 1988, Ser. No. 288,129
Int. Cl.[4] F21V 7/04
U.S. Cl. 362—31 8 Claims



1. A light transmitting plate member for illuminated signs, illuminated tables or a similar illuminated flat item and adapted for uniform diffusion of light from a light source position at a first side edge of a light transmitter having a substantially flat surface and an opposing surface having a gradual slope, the plate member having a reduced thickness in a direction away from said first side edge, said opposing surface including optically smooth surfaces including at least one of transparent and light transparent material with specific optical properties, wherein said opposing surface is provided with a plurality of angled divisions defined by transverse divisional lines extending parallel to said first side edge and positioned at one of uniform intervals or graded intervals which are reduced in the direction away from said first side edge, a height or a thickness of the light transmitting plate member at the transverse divisional lines is substantially equal to a thickness of the light transmitting plate member at said first side edge, and wherein angles of inclination subtended between the respective divisional lines and a plane extending parallel to said flat surface and in the direction away from said first side edge have a reducing thickness.

4,890,202

SYSTEM FOR MOUNTING DIFFERENT TYPES OF BULB ON THE REFLECTOR OF A LAMP

Andre Blanche, Montreuil, France, assignor to Societe Anonyme Financiere, Industrielle et Commerciale d'Equipements Automobiles et Aeronautiques-FICEA, Levallois Perrett, France

Filed Apr. 14, 1989, Ser. No. 338,833
Claims priority, application France, Apr. 19, 1988, 88 05134
Int. Cl.[4] B60Q 1/00; H01R 33/00
U.S. Cl. 362—61 7 Claims

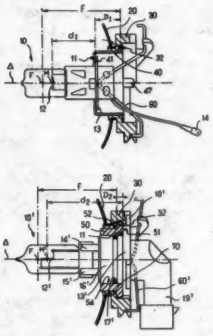
1. A mounting system for mounting a bulb on the reflector of a lamp, in particular the parabolic reflector of a headlamp for a vehicle such as a car, an agricultural machine, an earth-moving machine, or a hoist, the mounting system being such that the bulb may be selected from a first type of bulb and a second type of bulb, with the bulb in each of these types being associated with a radial reference surface situated at a predetermined respective distance d_1 or d_2 from the midpoint of the filament of the bulb, where d_1 is not equal to d_2; and

wherein the system comprises;

a bulb-carrier fixed to the reflector and defining a radial thrust surface situated at a predetermined distance from the focus of the reflector;

first adaptor means suitable for co-operating with a bulb of the first type, said first adaptor means being provided with an axial bore of a first diameter suitable for receiving the base or support of the bulb, said first adaptor means also including a first contact surface bearing against the reference surface of said first type of bulb, and a second contact surface bearing against the thrust surface of the bulb-carrier, said two contact surfaces being parallel to each other and being at a distance D_1 apart; and

second adaptor means suitable for co-operating with a lamp of the second type, said second adaptor means being provided with an axial bore of a second diameter suitable for receiving the base or the support of a lamp of the second type, said second adaptor means further including a first contact surface bearing against the reference surface of said bulb of the second type, and a second contact surface



bearing against the thrust surface of the bulb-carrier, said two contact surfaces being parallel to each other and being a distance D_2 apart, such that, algebraically, $D_2+d_2=D_1+d_1$;

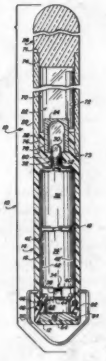
whereby regardless of the type of bulb mounted on the bulb-carrier by the corresponding adaptor means and regardless of the possible type of bulb support, the bulb filament is centered on the axis of the lamp and the axial position of the filament relative to the focus of the reflector is the same.

4,890,203

IDENTITY LIGHT

Thomas J. Watson, 312 Cheryl, White Rock, N. Mex. 87544

Filed Sep. 29, 1988, Ser. No. 250,922
Int. Cl.[4] A45B 3/02; A63B 15/02
U.S. Cl. 362—102 30 Claims



1. A self contained, hand held light in the form of a baton, comprising: a handle of cylindrical construction having a

battery compartment formed therewithin; a bottom cap removably received in mounted relationship on said handle for closing the lower end of the handle; said cap is rotatable respective to said handle;

a switch means connected to be actuated between a conducting and non-conducting position by said cap; a bulb supported at the upper end of the handle, means providing circuitry for said bulb whereby current flow from a battery which may be stored within said battery compartment is connected for energizing the bulb when said switch means is moved into the conducting position by said cap;

said switch means includes a switch blade connected to be rotated by the cap; and circumferentially spaced elongated strip conductors supported by the handle;

the end of the strip conductors form contacts that are engaged by the switch blade; a marginal end of the strip conductors are connected to a bulb holder and electrical receptacle;

a hollow, light transmitting cylinder attached to the upper end of the handle, a solid nose piece attached to the upper end of the cylinder;

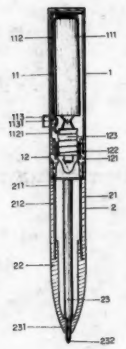
and means forming indicia is supported by said hollow cylinder while light from said bulb is propagated by said cylinder to said nose piece and thereby illuminates said nose piece.

4,890,204

BALL POINT PEN WITH SELF-PROVIDED ILLUMINATOR

Shyh-Ling Lin, and Yeong-Sung Lin, both of 8F-2, 375 Hsin-Yi Road, Sec 4, Taipei, Taiwan

Filed Feb. 22, 1988, Ser. No. 158,503
Int. Cl.[4] B43K *29/10*; F01L *21/00*
U.S. Cl. 362—118 **1 Claim**



1. A ballpoint pen with self provided illumination, comprising

an illuminating device that includes a power source arranged in an illuminating tube, an electrically conductive spring leaf being fixed to a sliding switch operatively mounted in said tube for connecting one pole of the circuit, the other pole of the power source being directly connected with the end-point of a lamp bulb mounted inside a lamp reflector, said lamp reflector is coupled with said illuminating tube by means of a screw joint;

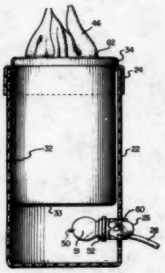
a writing device comprising an opaque combining tube, a transparent pen holder, a writing cartridge and a ballpoint pen nib operatively connected to each other, said combining tube comprising on the inner wall a transparent tubular ring for holding the writing cartridge in an operative position and a light reflecting sleeve coupled with the pen holder by means of a screw joint, said writing cartridge being mounted inside the writing device with the ballpoint pen nib protruding beyond the pen holder for writing, and said writing device being coupled with the illuminating device by means of a screw joint.

4,890,205

COMBINED NIGHT LIGHT AND PRE-MOISTENED TOWELLETTE WARMER

Dennis E. Shaffer, 1503 N. Weiland Apt. 3R, Chicago, Ill. 60610

Filed Jun. 20, 1988, Ser. No. 209,226
Int. Cl.[4] F21V *33/00*
U.S. Cl. 362—154 **18 Claims**



1. An apparatus for warming pre-moistened towellettes in their pre-packaged dispenser comprising:

a container closed at the bottom with an opening at the top suitably sized and adapted to accept the body of a rectangular dispenser where the rim of said dispenser rests on the top portion of the container and with an opening positioned in the bottom portion of the container;

an electrical heating means disposed within the container extending through the opening in the bottom portion of the container;

a removable container lid of suitable size to rest on the top portion of the container containing an opening in the top surface suitably sized and adapted to accept the body of a cylindrical dispenser where the rim of said dispenser rests on the top surface of the container lid; and

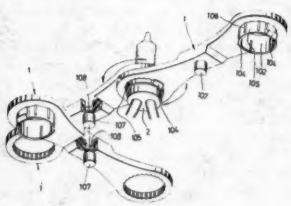
a means for mounting the electrical heating means to the opening in the bottom portion of the container.

4,890,206

CHRISTMAS LIGHT SET COMPILER

Shu-Hwa Lee, 7F, 16, Alley 3, Land 227, Nung-An St., Taipei, Taiwan

Filed Jun. 5, 1989, Ser. No. 361,215
Int. Cl.[4] F21S *1/14*
U.S. Cl. 362—227 **5 Claims**



1. A Christmas light set compiler comprised of a plurality of mounting elements for supporting Christmas light set, said

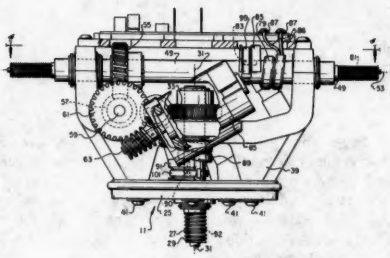
mounting elements each having a toothed hole and a mounting hole respectively made at each end a dowel disposed at one side in the middle of said mounting elements, and a circular retaining hole disposed at the other side of said mounting elements opposite to said dowel, said mounting elements being connectable with one another by means of matching of the mounting hole and/or the dowel of one mounting element with the toothed hole and/or the circular retaining hole of another mounting element, to conform to any preferred shape.

4,890,207

REMOTE CONTROLLED SPOTLIGHT SYSTEM

Danny C. Jones, Clifton, Tex., assignor to Star Beam, Inc., Clifton, Tex.

Filed Sep. 12, 1988, Ser. No. 245,033
Int. Cl.[4] F21S *1/00*
U.S. Cl. 362—233 **15 Claims**



1. A remote controlled spotlight system, comprising:
a horizontal shaft having a longitudinal axis and a bore;
a light mounted on the horizontal shaft;
means for rotating the horizontal shaft about the longitudinal axis of the horizontal shaft;
a vertical shaft having a longitudinal axis and a bore;
means for rotating the horizontal shaft about the longitudinal axis of the vertical shaft;
control means for remotely controlling the means for rotating the horizontal shaft about the longitudinal axis of the horizontal shaft and the means for rotating the horizontal shaft about the longitudinal axis of the vertical shaft; and
an electrical power cord extending from the light through the bore of the horizontal shaft, out through a hole in the horizontal shaft, at least once around the horizontal shaft, at least once around the vertical shaft, and then into the bore of the vertical shaft.

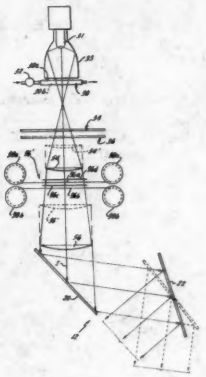
4,890,208

STAGE LIGHTING APPARATUS

George C. Izenour, Stony Creek, Conn., assignor to Lehigh University, Bethlehem, Pa.

Continuation of Ser. No. 909,489, Sep. 1[illegible]986, abandoned. This application Feb. 10, 1989, Ser. No. 308,747
Int. Cl.[4] F21V *29/00*
U.S. Cl. 362—294 **14 Claims**

1. Stage lighting apparatus, including a beam former comprising a lamp that emits a spectrum of visible and infra-red light, a reflector about said lamp for projecting light from the lamp as a beam, and beam modifying devices for imparting desired characteristics to the beam including devices that are vulnerable to damage by the infra-red content of a beam of light from the lamp, and infra-red filtering means including an infra-red filter disposed across the beam between the reflector and the beam modifying devices, said infra-red filter comprising a chamber having light-transmitting walls, a surface of the chamber facing the reflector bearing a dichroic layer that selectively passes visible light and reflects infra-red, said chamber being filled with liquid having the characteristics of selectively passing visible light and absorbing infra-red from the beam.

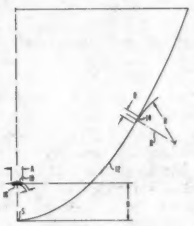


4,890,209

SEARCHLIGHT, IN PARTICULAR A PORTABLE SEARCHLIGHT WITH AN ACCOMPANYING CURRENT SUPPLY

Kunt O. Sassmannshausen, Rothenbach Str., Idar-Oberstein, Fed. Rep. of Germany

Filed Apr. 29, 1985, Ser. No. 728,240
Claims priority, application Fed. Rep. of Germany, Apr. 28, 1984, 3415935
Int. Cl.[4] F21V *7/00*
U.S. Cl. 362—348 **16 Claims**



1. A searchlight including an accompanying current supply, an illuminant having a coiled portion wound from wire filament serving as a light source a concave mirror reflector having an axis and an apex therein, and a focal area and wherein the reflecting surface of the concave mirror reflector has deviations from the mathematical shape of a paraboloid, comprising individual windings of the illuminant wherein the mean distance therebetween is less than twice the diameter of the filament, the deviations in the reflecting surface of the concave mirror reflector being in the form of spherical segments, the maximum extent of which measured at right angles to their respective radii, are between 25 and 60 percent of the square root of the distance of the center of the focal area and the apex of the concave mirror reflector, and the radii of the respective spherical segments being no greater than the maximum distance between two points on the coiled portion of the illuminant, multiplied by a factor being between 18 and 45 divided by

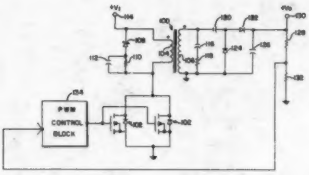
the square root of the distance between the center of the focal area and the apex of the concave mirror reflector.

4,890,210

POWER SUPPLY HAVING COMBINED FORWARD CONVERTER AND FLYBACK ACTION FOR HIGH EFFICIENCY CONVERSION FROM LOW TO HIGH VOLTAGE

Howard M. Myers, Greensboro, N.C., assignor to Gilbarco, Inc., Greensboro, N.C.

Filed Nov. 15, 1988, Ser. No. 272,006
Int. Cl.[4] H02M *3/335*
U.S. Cl. 363—21 **23 Claims**



1. A non-resonant switching power supply comprising:

a transformer including a primary winding, and a secondary winding, said windings each having a polarized end;

a first terminal for receiving a relatively low level positive DC voltage, said first terminal being connected to the polarized end of said primary winding;

a first capacitor of relatively large capacitance having one end connected to the polarized end of said secondary winding;

a first diode having a cathode electrode connected to the other end of said first capacitor, and an anode electrode connected to a source of reference potential;

a second diode having an anode electrode connected to the common connection of said first capacitor and said first diode, and a cathode electrode;

a second capacitor connected between the cathode electrode of said second diode and said source of reference potential;

an output terminal connected to the common connection of said second diode and second capacitor;

control means connected between the other end of said primary winding and a source of reference potential, for in an iterative manner alternately connecting the other end of said primary winding to said source of reference potential for a first period of time, for causing current to flow through said primary winding, in turn causing forward current to flow through said secondary winding, first capacitor, second diode, and second capacitor, for in an initial cycle of operation placing an initial charge on said second capacitor, and in subsequent cycles of operation charging said second capacitor to have a positive voltage level thereacross approaching the sum of the secondary winding voltage and the voltage across said first capacitor, said control means in each cycle of operation next operating to disconnect said primary winding from said source of reference potential for a second period of time, causing said current due to flyback energy in said secondary winding to flow through said first diode, first capacitor, and secondary winding in a direction opposite to that of the forward current flow, for in a non-resonant manner charging said first capacitor to develop thereacross a level of voltage approaching the level of the maximum fly-back voltage developed across said secondary winding; and

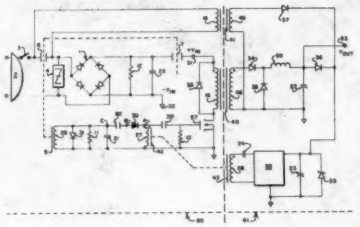
said first capacitor being made large enough to not lose an excessive amount of charge during the time that forward current flows through said secondary winding for maintaining its contribution of current to a load connected between said output terminal and said source of reference potential, and maintaining the voltage level across the load.

4,890,211

SWITCHING MODE POWER SUPPLY START-UP CIRCUIT

Mark Telefus, 2518 14th Ave., San Francisco, Calif. 94127

Continuation of Ser. No. 152,680, Feb. 5, 1988, abandoned. This application Mar. 2, 1989, Ser. No. 318,512
Int. Cl.[4] H02M *5/458, 7/537*
U.S. Cl. 363—37 **5 Claims**



1. A power supply having a primary side and a secondary side, said primary side coupled to an alternating current power source, said primary side comprising;

a first primary winding coil of a first transformer having a first lead coupled with said alternating current power source and a second lead coupled through a filter means with said alternating current power source;

a second primary winding coil of a second transformer having a first lead coupled with a rectifying means;

latch means for preventing current flow from said alternating current power source to said rectifying means coupled with said alternating current power source and said rectifying means;

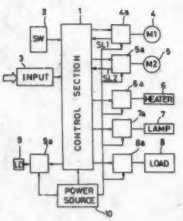
latching enabling means coupled with said latch means for closing said latch means responsive to receiving electrical pulses from said secondary side.

4,890,212

ELECTRIC APPARATUS HAVING A START-UP CONTROL FUNCTION

Toshihiko Kumon, and Nobuaki Nishioka, both of Toyokawa, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Oct. 15, 1987, Ser. No. 109,092
Claims priority, application Japan, Oct. 23, 1986, 61-252184
Int. Cl.[4] H02J *3/14*
U.S. Cl. 363—49 **9 Claims**



1. In a recording apparatus having a plurality of electrical devices that enable a recording operation and which require start-up electric currents exceeding an amount of current re-

quired at ordinary operational states of those devices, said devices including a motor for providing a rotational movement, the improvement comprising:

a power source;

power supply means provided for each of the devices for supplying electric power from said power source to the respective device;

stable detecting means provided for the motor for detecting rotation of the motor and for generating a stable state signal when it is detected that the rotation of the motor becomes stable after a start-up thereof, and

control means for controlling said power supply means to provide electric power to a subsequent device in response to the output of the stable state signal generated from the state detecting means of the previously started motor.

4,890,213

POWER CONVERTER DEVICE HAVING STARTING CIRCUITS AND A METHOD FOR STARTING THE POWER CONVERTER DEVICE

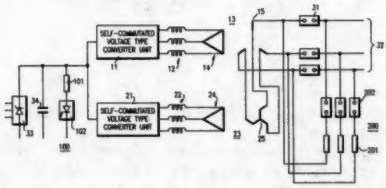
Nagataka Seki, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 198,851, May 26, 1988, abandoned. This application Dec. 2, 1988, Ser. No. 279,277

Claims priority, application Japan, May 28, 1987, 62-129616

Int. Cl.[4] H02J *3/36*

U.S. Cl. 363—49 **14 Claims**



1. A power converter device, comprising:

a plurality of self-commutated voltage type converters, each connected to a common d.c. circuit;

a plurality of transformers, each having d.c. windings and a.c. windings, each of the d.c. windings being connected to an a.c. output terminal of a respective one of the converters and each of the a.c. windings being connected in series;

a first a.c. switch means, through which the serially connected a.c. windings of said transformers are connected to a utility power system;

a capacitor provided in said common d.c. circuit;

a current limiting means, connected in parallel with said first a.c. switch means, having a series circuit of a current limiting element and a second a.c. switch means;

wherein prior to starting said converters, said first a.c. switch means is opened and said second a.c. switch means is closed.

4,890,214

START CIRCUIT FOR ADAPTING A CONSTANT CURRENT GENERATOR TO A WIDE VARIETY OF LOADS

Hideki Yamamoto, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 931,094, Nov. 17, 1986, abandoned. This application May 20, 1988, Ser. No. 196,575

Claims priority, application Japan, Nov. 15, 1985, 60-255012

Int. Cl.[4] H02M *7/5375*

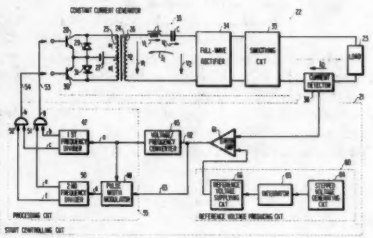
U.S. Cl. 363—49 **1 Claim**

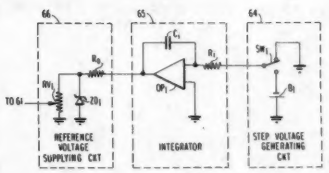
1. A start controlling circuit for delivering a start signal to a constant current generator to cause said constant current generator to supply an output current to a load through which a load current flows in response to said output current, said start controlling circuit including current detecting means for detecting said load current to produce a detection voltage corresponding to said load current, converting means for converting a control voltage variable from zero to a positive voltage into a first pulse sequence having a pulse repetition period which decreases in response to a rise in said control voltage, processing means responsive to said control voltage for processing said first pulse sequence into a second pulse sequence having a pulse width which increases in response to said rise, and means for supplying said second pulse sequence to said constant current generator as said start signal,

said start controlling circuit comprising:

reference voltage producing means for producing a d.c. reference voltage gradually rising from zero to a predetermined reference voltage;

error amplifying means having a pair of input terminals connected to said detecting means and to said reference voltage producing means, for amplifying an error signal





representing an error between said detection voltage and said d.c. reference voltage, to produce an amplified voltage; and

means for directly supplying said amplified voltage to said converting means and to said processing means as said control voltage;

said reference voltage producing means comprising:

voltage generating means for generating a step voltage which substantially instantaneously rises from zero to a preselected voltage;

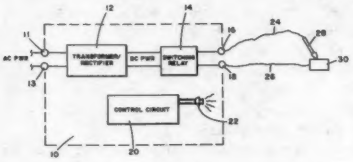
integrating means coupled to said voltage generating means for integrating said step voltage to produce an integrated voltage which gradually rises from zero toward said preselected voltage; and

voltage shaping means coupled to said integrating means for shaping and limiting said integrated voltage to form said d.c. reference voltage, said voltage shaping means including means for varying said d.c. reference voltage when a variation of said load results in a change in said load current.

4,890,215
ELECTRICAL APPARATUS WITH REVERSE AUDIBLE ALARM

Herb Freedman, Willowdale, Canada, assignor to Selectrons Ltd., New York, N.Y.

Filed Jun. 30, 1988, Ser. No. 214,151
Int. Cl.[4] H02M 7/02
U.S. Cl. 363—63 **8 Claims**



1. An electrical apparatus having forward and reverse states, to provide electrical power to a tool, comprising:

(a) input means to receive input electrical power;

(b) output means for electrical connection to said tool;

(c) switching means connected to said input means to selectively change between said forward and reverse states and connected to provide on said output means forward or reverse electrical energization; and

(d) alarm means connected to said switching means to produce an audible sound when said electrical apparatus is in one of said forward and reverse states.

4,890,216
HIGH FREQUENCY POWER UNIT FOR GENERATING GAS LASERS

Akira Egawa, Yamanashi, Japan, assignor to Fanuc Ltd., Yamanashi, Japan

PCT No. PCT/JP87/00773, § 371 Date Jun. 13, 1988, § 102(e) Date Jun. 13, 1988, PCT Pub. No. WO88/02937, PCT Pub. Date Apr. 21, 1988
PCT Filed Oct. 14, 1987, Ser. No. 207,091
Claims priority, application Japan, Oct. 15, 1986, 61-243206
Int. Cl.[4] H02M 7/00
U.S. Cl. 363—124 **2 Claims**

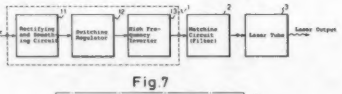
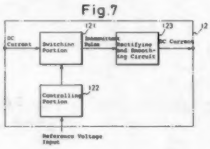


Fig. 7

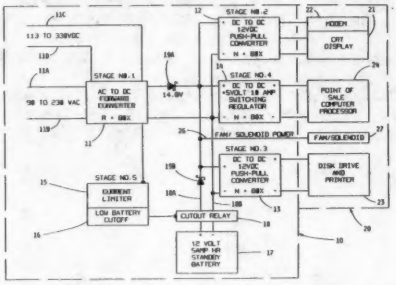


1. A high frequency power unit, comprising a switching regulator; and a high frequency inverter, wherein said switching regulator comprises a controlling portion which receives a pulse drive frequency input, a switching portion and a rectifying and smoothing portion, wherein said controlling portion outputs a control signal having a predetermined frequency which is substantially higher than the frequency of said pulse drive frequency input, and said signal being intermittently in an "ON" state, and the duration of the "ON" state of the signal can be arbitrarily set, wherein said switching portion receives a dc current, and outputs intermittent pulses by periodically passing through and interrupting the dc current according to the state of the control signal, and wherein said rectifying and smoothing portion rectifies and smooths the output of the switching portion and transforms the output of the switching portion to a dc current, and wherein the high frequency inverter transforms the dc current from the switching portion to a high frequency current.

4,890,217
UNIVERSAL POWER SUPPLY, INDEPENDENT CONVERTER STAGES FOR RESPECTIVE HARDWARE COMPONENTS OF A COMPUTERIZED SYSTEM

David W. Conway, Cedar Rapids, Iowa, assignor to Norand Corporation, Cedar Rapids, Iowa

Continuation of Ser. No. 225,558, Jul. 26, 1988, abandoned, which is a continuation-in-part of Ser. No. 60,680, Jun. 10, 1987, abandoned. This application Feb. 17, 1989, Ser. No. 312,404
Int. Cl.[4] H02M 7/04
U.S. Cl. 363—143 **24 Claims**



1. In a power supply, power supply transformer means having primary

winding means and secondary winding means, rectifier means having alternating polarity input means for receiving input alternating current potentials over a range from about one hundred volts r.m.s. to at least about two hundred and twenty volts r.m.s., and having unidirectional output means,

control circuit means including current control switch means interposed between said unidirectional output means and said primary winding means for supplying generally constant volt-second product to said primary winding means for input alternating current potentials over said range between about one hundred volts and at least about two hundred and twenty volts, and

direct current input means coupled between said unidirectional output means and said current control switch for receiving direct current input voltages over a range from about one hundred and thirteen volts to about three hundred and thirty volts,

said current control switch means being selectively energizable for activating said primary winding means in response to alternative current power applied to said alternating polarity input means and in response to direct current power applied to said direct current input means.

4,890,218
VARIABLE LENGTH INSTRUCTION DECODING APPARATUS HAVING CROSS COUPLED FIRST AND SECOND MICROENGINES

Jeffry M. Bram, Natick, Mass., assignor to Raytheon Company, Lexington, Mass.

Continuation of Ser. No. 881,301, Jul. 2, 1986, abandoned. This application Aug. 10, 1988, Ser. No. 231,646
Int. Cl.[4] G06F 9/28
U.S. Cl. 364—200 **24 Claims**

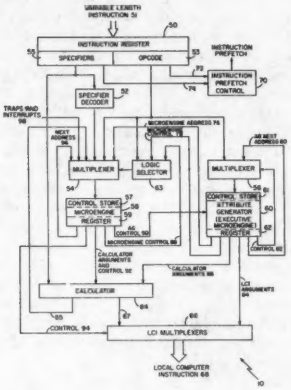
1. An instruction preparation unit of a computer system comprising:

register means for storing a variable length instruction;

first microengine means coupled to said register means for decoding a first portion of said instruction and decoding a second portion for said instruction having said second portion;

second microengine means, coupled to said register means and having an input coupled to a first output of said first microengine means and a first output of said second microengine means coupled to an input of said first microengine means, for decoding said first portion of said instruction to generate signals for a local computer instruction;

calculator means, having inputs coupled to a second output of said first and second microengine means and to outputs



of said register means and having a first output coupled to an input of said first microengine means, for performing calculations to generate signals for said local computer instruction; and

means coupled to a second output signal of said calculator means and a third output of said second microengine means for selecting one or more portions of decoded signals from said third output of said second microengine means and/or one or more portions of said calculator means second output signal in response to control signals generated by said first microengine means to form said local computer instruction.

4,890,219

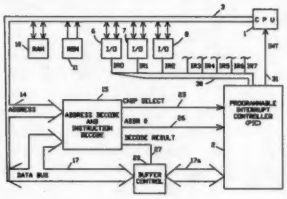
MODE CONVERSION OF COMPUTER COMMANDS

Chester A. Heath, Boca Raton; Kevin M. Jackson, Delray Beach; Darryl E. Judice, Boynton Beach, and Hoshang R. Pestonji, Coral Springs, all of Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 24, 1987, Ser. No. 29,511

Int. Cl.[4] G06F *5/00*

U.S. Cl. 364—200 **12 Claims**



1. A computer system normally designed for operation with certain software commands in a first interrupt command mode and including (1) a bus over which commands are transmitted and (2) logic for sending at least one initialization command on said bus to cause setup for said first interrupt command mode, said computer system comprising:

a programmable device controllable by a command to operate in either a first interrupt command mode or a second interrupt command mode and connected to receive commands over said bus, said programmable device being set by said initialization command to said first interrupt command mode; and

detecting means connected to said bus to intercept commands prior to receipt by said programmable device, for detecting software commands in said second interrupt command mode, converting said second type signal command mode command to a corresponding first interrupt command mode command and applying said converted command to said bus for receipt by said programmable device.

4,890,220

VECTOR PROCESSING APPARATUS FOR INCREMENTING INDICES OF VECTOR OPERANDS OF DIFFERENT LENGTH ACCORDING TO ARITHMETIC OPERATION RESULTS

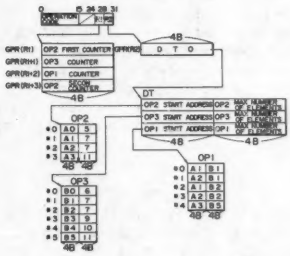
Yaoko Nakagawa, and Koichi Ishii, both of Hadano, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 10, 1985, Ser. No. 806,801

Claims priority, application Japan, Dec. 12, 1984, 59-260708; Feb. 14, 1985, 60-26893

Int. Cl.[4] G06F *7/06*

U.S. Cl. 364—200 **6 Claims**



1. A vector processing apparatus comprising:

memory means for storing a plurality of vector operands comprising different numbers of elements;

indicating means for indicating a start address in said memory means and a maximum number of elements for each of a plurality of vector operands in response to an instruction;

address means for controlling fetching of the elements of each of the vector operands from said memory means in accordance with the start addresses supplied from said indicating means;

vector processing means for processing the elements of the vector operands fetched from said memory means and for determining the element to be next processed in accordance with an operation result of said processing of the elements;

said vector processing means including buffer means for storing the elements of the vector operands fetched from said memory means, control means for controlling the fetching of an element to be next processed from said buffer means in accordance with said operation result, and a plurality of element count means for counting the number of elements of each of the vector operands processed

by said vector processing means, each of said element count means being updated by said control means in accordance with said operation result;

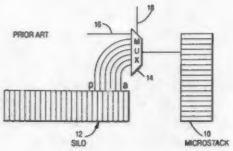
said control means including means for determining the end of processing based on the maximum numbers of elements of each of the vector operands indicated by said indicating means and the count of each element count means.

4,890,221

APPARATUS AND METHOD FOR RECONSTRUCTING A MICROSTACK

Lindsay D. Gage, Arlington, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Apr. 1, 1988, Ser. No. 176,609
Int. Cl.[4] G06F 9/00
U.S. Cl. 364—200 **23 Claims**



1. An arrangement, in a computer which issues a trap handler address to respond to occurrence of a trap, for receiving addresses of computer instructions from a pipeline, storing and returning said addresses to said pipeline, said arrangement comprising:

a stack having locations for receiving, storing and returning said addresses, said stack having states;

means for maintaining a linked listing of an order in which said addresses are to be returned by said stack, said means for maintaining being coupled to said stack; and

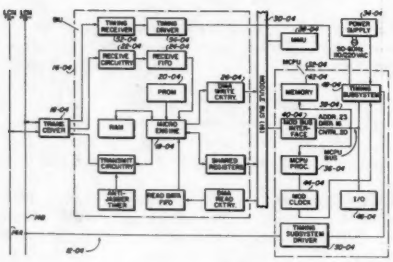
means for restoring said stack from said linked listing after said trap handler address issuance into a state which is equivalent to a state said stack would have if no trap had occurred, said means for restoring being coupled to said stack.

4,890,222

APPARATUS FOR SUBSTANTIALLY SYNCRONIZING THE TIMING SUBSYSTEMS OF THE PHYSICAL MODULES OF A LOCAL AREA NETWORK

David L. Kirk, Phoenix, Ariz., assignor to Honeywell Inc., Minneapolis, Minn.

Division of Ser. No. 682,645, Dec. 17, 1984, Pat. No. 4,709,347. This application Jun. 24, 1987, Ser. No. 65,974
Int. Cl.[4] G06F 9/00
U.S. Cl. 364—200 **1 Claim**



1. In a local area network having a plurality of modules, each module being capable of communicating with every other module over a network bus, and wherein each module includes a module central processor unit (MCPU), and an associated clock unit operatively connected to the MCPU providing clock pulses thereto, and wherein each module is adapted to be powered by a source of a.c. power having a given frequency, and further wherein each module includes a timing subsystem capable of being substantially synchronized to a master timing subsystem, said timing subsystem comprising:

(a) first means, adapted to receive said clock pulses, an a.c. reference timing signal generated from said source of a.c. power, commands from said MCPU, and a timing frame, for generating timing information from said clock pulses or said a.c. reference timing signal in response to said commands received from said MCPU, thereby resulting in the timing information synchronized to said clock pulses or to said a.c. reference timing signal;

(b) register means, coupled to said first means to said MCPU, for storing said timing information, thereby making said timing information available to the MCPU; and

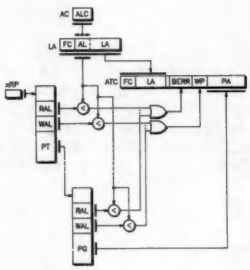
(c) second means, coupled to said register means and said first means, for updating the timing information stored in said register means with the timing information included in said timing frame in response to a predetermined command from said MCPU, the timing frame being periodically transmitted by the timing subsystem designated as the master timing subsystem to each timing subsystem of each module via the network bus, the timing frame including the timing information generated by the master timing subsystem, thereby resulting in having the timing information of each timing subsystem of each module substantially synchronized to the timing information of the master timing subsystem.

4,890,223

PAGED MEMORY MANAGEMENT UNIT WHICH EVALUATES ACCESS PERMISSIONS WHEN CREATING TRANSLATOR

Michael W. Cruess; William C. Moyer, both of Austin, Tex., and John Zolnowsky, Milpitas, Calif., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 819,179, Jan. 15, 1986, abandoned. This application Jul. 21, 1988, Ser. No. 223,731
Int. Cl.[4] G06F 12/10, 12/14
U.S. Cl. 364—200 **22 Claims**



15. In a paged memory management unit (PMMU) adapted to translate each of a plurality of logical addresses into a corresponding physical address using a selected one of a plurality of descriptors comprising one or more translation tables stored in a memory, the PMMU receiving each of said logical addresses and the corresponding physical address into a respective translator, said PMMU including: said

a cache having a plurality of storage locations for storing said translators, each of said storage locations including a read protect indicator adapted to be selectively set;

control means for assembling each of said addresses and the corresponding physical address into a respective translator and controlling the storing of each translator in a selected one of said storage locations, the control means setting the read protect indicator of said one storage location in response to a read protect signal associated with the descriptor used to assemble said translator; and

access control means for preventing said translator from being used to translate said logical address in support of a read operation when the read protect indicator of said one storage location is set;

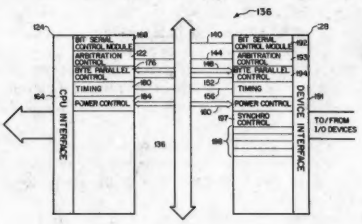
wherein said logical address has an access privilege level associated therewith and said descriptor includes a selected read access privilege level, said control means setting said read protect indicator of said one storage location to prevent said translator from being used in support of a read operation when the access privilege level associated with said logical address is logically less than said read access privilege level of said descriptor, wherein said translator is assembled by the control means and stored in said on ®storage location even when the access privilege level associated with said logical address is not logically less than said read access privilege level of said descriptor, but is not allowed by the access control means to be used in support of a read operation, even when said descriptor used to assemble said translator does not have said read protect signal associated therewith, unless the access privilege level associated with said logical address is at least equal to said read access privilege level of said descriptor.

4,890,224

METHOD AND APPARATUS FOR FAULT TOLERANT COMMUNICATION WITHIN A COMPUTING SYSTEM

Michael J. Fremont, Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jun. 27, 1986, Ser. No. 879,720
Int. Cl.[4] G06F *11/16, 13/38*
U.S. Cl. 364—200 **18 Claims**



1. Apparatus for communicating information among a plurality of information processing elements comprising:

byte-parallel communicating means, coupled to each of the information processing elements in the plurality of processing elements, for communicating information among the plurality of information processing elements in byte-parallel format;

bit-serial communicating means, coupled to each of the information processing elements in the plurality of processing elements, for communicating information among the plurality of information processing elements in bit-serial format; and

selecting means, coupled to the bit serial communicating means, for selecting for every information processing element in the plurality of processing elements which information communicating means shall communicate information, the selecting means including means for communicating a switching signal through the bit-serial communicating means upon detection of a fault in communication of information through the byte-parallel communicating means;

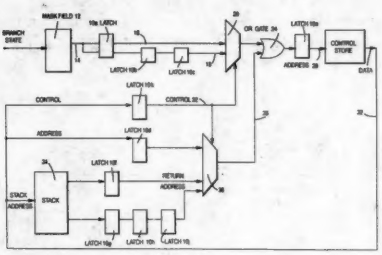
wherein upon receipt of the switching signal from another information processing element the selecting means selects the bit serial communicating means to communicate information, information then being exclusively communicated through the bit-serial communicating means and not through the byte-parallel communicating means.

4,890,225

METHOD AND APPARATUS FOR BRANCHING ON THE PREVIOUS STATE IN AN INTERLEAVED COMPUTER PROGRAM

Ronald M. Ellis, Jr., Wilton, N.H.; Oren L. Wiesler, Acton, Mass., and Christopher A. Mega, Wilton, N.H., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Apr. 1, 1988, Ser. No. 176,607
Int. Cl.[4] G06F *9/42*
U.S. Cl. 364—200 **13 Claims**



1. An arrangement in a computer for conditionally changing destination addresses of an interleaved computer program having first and second instruction flows and conditional branching, said computer having branch states, and said arrangement comprising:

means for sensing a branch state of said computer to determine if said branch state satisfies a branch condition of said program, said branch state that is sensed being a sensed branch state;

means for changing a destination address of an instruction in a first instruction flow in response to satisfaction of said branch condition by said sensed branch state, said means for changing being coupled to said means for sensing; and

means for saving said sensed branch state and changing a destination address of an instruction from a second instruction flow in response to satisfaction of said branch condition by said sensed branch state said sensed branch state that is saved being a saved sensed branch state, said means for saving being coupled to said means for sensing.

4,890,226

MEMORY ACCESS CONTROL APPARATUS HAVING EMPTY REAL ADDRESS STORING MEMORY AND LOGICAL ADDRESS/REAT ADDRESS PAIR STORING MEMORY

Sumio Itoh, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 704,550, Feb. 22, 1985, abandoned.
This application Dec. 14, 1987, Ser. No. 134,605
Claims priority, application Japan, Feb. 29, 1984, 59-37883
Int. Cl.[4] G06F *12/10, 3/12*
U.S. Cl. 364—200 **14 Claims**

1. A memory access control apparatus comprising:

a memory having a memory capacity for storing data of a plurality of first transfer units forming a second transfer unit, the data being divided into said first transfer units and respectively stored in different storing locations, the storing locations being allocated with read addresses;

an empty real address storing means for storing empty real

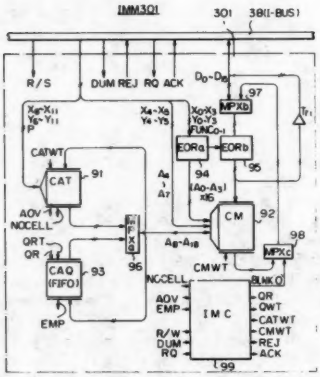
addresses of the storing locations into which data can be written;

address pair storing means for storing real addresses corresponding to logical addresses of the first transfer units of data stored in said memory, said real addresses being those of the storing locations in said memory where said first transfer units of data are stored;

data write-in means, connected to said empty real address storing means, for writing data into a storing location in said memory corresponding to an empty real address read from said empty real address storing means each time a first transfer unit of data is transferred;

data read-out means, connected to said address pair storing means, for reading data from the storing location in said memory corresponding to the real address of a given logical address, the real address being read from said address pair storing means each time a logical address of one of said first transfer units is received; and

control means, connected to said address pair storing means and said data read-out means, for allocating logical addresses constructing a sequence according to a sequence of said first transfer units to be read out for reach said second transfer unit, for effecting a write operation in which data in said first transfer units within each said second transfer unit are randomly transferred to said data write-in means to effect the write process in said data write-in means, and at the same time for storing, in said address pair storing means, a correspondence between the logical address allocated to said first transfer units and the real address of the storing location in said memory into which said data has been written, for effecting a read operation in which logical addresses corresponding to respective first transfer units in said allocated sequence are output to said data read-out means, and for storing the real address of the storing location in said memory, from which the data of said first transfer units has been read by said data read-out means, into said empty real address storing means, when a continuous writing operation is effected on an n page, a continuous reading operation is simultaneously effected from an n-1 page, where n is a positive integer greater than or equal to 2.



4,890,227

AUTONOMOUS RESOURCE MANAGEMENT SYSTEM WITH RECORDED EVALUATIONS OF SYSTEM PERFORMANCE WITH SCHEDULER CONTROL INCLUDING KNOWLEDGE LEARNING FUNCTION

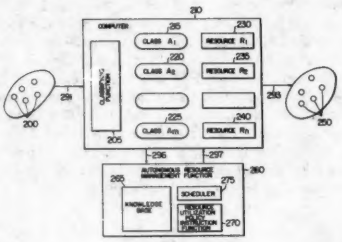
Toshinori Watanabe, Sagamihara; Koichi Haruna, Yokohama; Hiroshi Motoyama, Tokyo; Toru Nishigaki, Sagamihara; Koji Sasaki, Tokyo; Teruo Yakata, Yokohama, and Yoshitaka Watanabe, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 631,803, Jul. 17, 1984, abandoned. This application Aug. 25, 1987, Ser. No. 89,919

Claims priority, application Japan, Jul. 20, 1983, 58-130820

Int. Cl.[4] G06F *11/34, 13/14*

U.S. Cl. 364—300 **28 Claims**



1. A resource management method for a computer system having resources and in which a plurality of process units compete for utilization of resources, a scheduler to control the resource utilization, a sensor to detect a system status including resource utilization status and a memory, the method to be performed during normal operation of the computer system without operator intervention comprising the steps of:

storing sets of control knowledge data in said memory, each set of control knowledge data including status data representative of a system status as detected by said sensor, control data for controlling said scheduler determined on the basis of said status data of the set and data representative of an effect of applying said control data of the set to said scheduler;

selecting one set of said control knowledge data whose status data substantially corresponds to current status data detected by said sensor to obtain an improved control data applying effect;

modifying control data contained in said selected set of control knowledge data and sending the modified control data to said scheduler;

detecting an effect of applying said modified control data to said scheduler for determining application effect data representative of an effect of applying said modified control data to said scheduler; and

updating said stored control knowledge data on the basis of said current status data, the modified control data corresponding to said current status data and the application effect data resulting from applying said modified control data to said scheduler, whereby overall system performance for similar system status is improved with time.

4,890,228

ELECTRONIC INCOME TAX REFUND EARLY PAYMENT SYSTEM

Ross N. Longfield, Far Hills, N.J., assignor to Beneficial Management Corporation of America, Peapack, N.J.

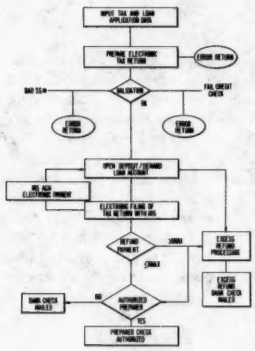
Filed Jan. 21, 1988, Ser. No. 146,324

Int. Cl.[4] G06F *15/21*

U.S. Cl. 364—408 **8 Claims**

1. An electronic data processing system for preparing income tax returns and authorizing refund loans comprising:

(a) at least one programmable electronic data processing means for executing programmed arithmetic and logical processes and storing data;
(b) at least one input means for inputting tax preparer data, tax return data and loan application data to said at least one data processing means;
(c) program means executable by said at least one data processing means for processing said tax preparer data and said tax return data and creating electronic tax return data files;
(d) program means executable by said at least one data processing means for processing loan application data and creating deposit/loan account files at an authorized financial institution;



(e) program means executable by said at least one data processing means for processing said tax return data files and said deposit/loan account files and for transmitting electronic tax return data to at least one electronic data processing means contolled by at least one tax collecting authority and for authorizing receipt by said credit institution of electronic funds transfer data from at least one electronic data processing means controlled by at least one tax collecting authority; and
(f) program means executable by said at least one data processing means for processing said tax return data files and said deposit/loan account files and authorizing payment by said financial institution of a tax refund loan amount from said deposit/loan account whereby said payment may be made prior to tax return processing and refund payment by said tax collecting authority.

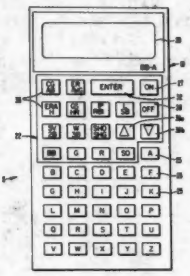
4,890,229

ELECTRONIC BASEBALL CARD

Paul J. Rudnick, Castro Valley, Calif., assignor to Psicom Sports Incorporated, Dublin, Calif.

Filed Feb. 19, 1988, Ser. No. 158,193
Int. Cl.[4] G06F *15/40*
U.S. Cl. 364—410 **4 Claims**

1. A hand-held portable electronic apparatus for providing a user with baseball information on demand, comprising:
a keyboard having a set of alphabet keys, an ENTER key, at least one cursor key, and a plurality of statistic keys;
means for storing a compressed database comprising historical and statistical data for major league baseball players and teams, said database including for each player a header record and cumulative and yearly statistical records;
a display device for providing a visual display to allow the user to view selected data; and
a programmed microcomputer having
means responsive to a sequence of alphabet keys for creating a pointer to the closest header record,
means responsive to said ENTER key for causing the header information pointed to by said pointer to be displayed,
means responsive to said cursor keys and operable when said header information is being displayed for displaying neighboring header information,



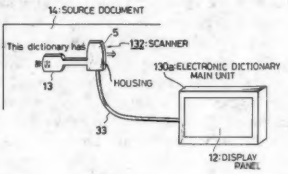
means responsive to said statistic keys and operable when header information is being displayed for displaying a statistical record, and
means responsive to said cursor keys and operable when a statistic is being displayed for displaying the same statistic for additional years.

4,890,230

ELECTRONIC DICTIONARY

Katsuhide Tanoshima, and Hikoshi Nagasawa, both of Tokyo, Japan, assignors to Electric Industry Co., Ltd., Tokyo, Japan

Filed Dec. 17, 1987, Ser. No. 135,525
Claims priority, application Japan, Dec. 19, 1986, 61-301760; Jan. 19, 1987, 62-8069; Jan. 19, 1987, 62-8070; Feb. 13, 1987, 62-29884
Int. Cl.[4] G06F *15/38*; G06K *9/22*
U.S. Cl. 364—419 **12 Claims**



1. An electronic dictionary for electronic translation of words or compound words in a source language at locations on a source medium, to corresponding words or compound words in a target language, the electronic dictionary comprising:
a housing;
an optical reader fixedly mounted in said housing so as to be fixed relative thereto, which optically reads from the source medium the source language to be translated;
a translation unit which produces, on the basis of data output from the optical reader, an output in target language, corresponding to the source language; and
means, including a printer fixedly mounted in said housing so as to be fixed relative to said housing and said optical reader, for automatically printing the target language produced by the translation unit at a fixed position on said source medium relative to the location on the source

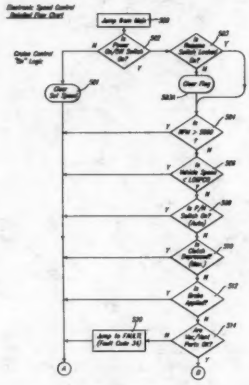
medium of the source language corresponding to the target language to be printed.

4,890,231

METHOD OF DISABLING A RESUME SWITCH IN AN ELECTRONIC SPEED CONTROL SYSTEM FOR VEHICLES

Douglas C. Frantz, Lake Orion, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.

Filed Mar. 6, 1987, Ser. No. 23,166
Int. Cl.[4] G06F *15/20*
U.S. Cl. 364—426.04 **3 Claims**



1. In a method for use in an electronic speed control system for a vehicle with an internal combustion engine with a throttle, a throttle position indicator, and a vacuum source where the electronic speed control system includes: a vacuum actuator, a vacuum reservoir and a valve body with a vacuum solenoid, a vent solenoid and a purge vent solenoid to work with a voltage source and switches and sensors including a set switch, resume switch, power on/off switch, park/neutral or clutch switch, a speed sensor, and a brake switch; signal conditioning; a memory for storing data including point slope curves and look-up tables; an A/D converter; a vacuum solenoid driver and interface; a vent solenoid driver and interface and a microcontroller with input/output ports hereafter called vac/-vent ports, to communicate with the valve body, where one of the uses for the microcontroller is for processing signals generated by the voltage source and switches and sensors which represent various speed control conditions, including a resume condition, as selected by the operator of the vehicle;

the method for preventing an additional occurrence of a resume condition when in a locked-on condition comprising:

monitoring the condition of the resume switch;

preventing, after a previous disengagement of the operation of the electronic speed control, an additional occurrence of a resume condition, if the resume switch is engaged, such that a resume of electronic speed control operation is allowed only after a previous disengagement of the resume switch; and

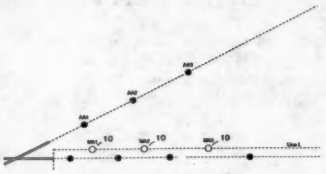
preventing an additional occurrence of a resume condition, by disabling the resume switch when in a locked-on condition.

4,890,232

DISPLAY AID FOR AIR TRAFFIC CONTROLLERS

Anand D. Mundra, Takoma Park, Md., assignor to The Mitre Corporation, Bedford, Mass.

Filed Feb. 1, 1988, Ser. No. 150,775
Int. Cl.[4] G06F *15/48*
U.S. Cl. 364—439 **5 Claims**



1. Apparatus for displaying the locations of aircraft on a first approach or first stream onto a line substantially parallel to a second approach or second stream converging with the first approach or first stream comprising:

apparatus for computing distances of aircraft on the first approach or first stream from a point of reference, such as a point of intersection of the two approaches or streams;

visual display apparatus; and

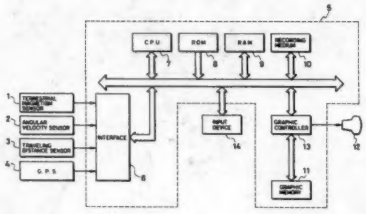
apparatus for drawing on said visual display apparatus a symbol for the aircraft on the first approach or first stream onto the line parallel to the second approach or second stream at said distances from the point of reference.

4,890,233

VEHICLE BEARING DETECTION AND DATA PROCESSING METHODS APPLICABLE TO VEHICLE NAVIGATION SYSTEM

Hitoshi Ando; Takashi Kashiwazaki; Masayuki Hosoi, and Atsuhiko Fukushima, all of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Oct. 27, 1987, Ser. No. 113,109
Claims priority, application Japan, Oct. 27, 1986, 61-255461; Oct. 27, 1986, 61-255462; Oct. 27, 1986, 61-255463; Oct. 27, 1986, 61-255464; Oct. 27, 1986, 61-255466; Oct. 30, 1986, 61-259223
Int. Cl.[4] G01C *21/00*; G08G *1/12*
U.S. Cl. 364—457 **16 Claims**



1. In a method for detecting the bearing of a vehicle equipped with a terrestrial magnetism sensor for producing vehicle bearing data according to terrestrial magnetism on the basis of the output data of said terrestrial magnetism sensor, the improvement comprising the steps of: employing a bearing obtained from map data when a process of recognizing the present vehicle location on the basis of said map data while said vehicle is traveling at a speed higher than a predetermined speed has been effected, and discarding output data from said terrestrial magnetism sensor.

4,890,234

NC DATA MODIFICATION METHOD

Kunio Tanaka, and Yasushi Onishi, both of Tokyo, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

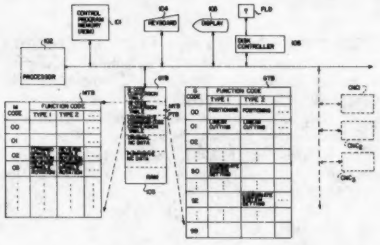
PCT No. PCT/JP87/00295, § 371 Date Jan. 7, 1988, § 102(e) Date Jan. 7, 1988, PCT Pub. No. WO87/07046, PCT Pub. Date Nov. 19, 1987

PCT Filed May 12, 1987, Ser. No. 150,654

Claims priority, application Japan, May 15, 1986, 61-111385

Int. Cl.[4] G06F *15/46;* G05B *19/403*

U.S. Cl. 364—474.23 4 Claims



1. A numerical control (NC) data modification method for changing first NC data to second NC data of a different type, comprising the steps of:

storing a conversion table having at least one of a G-code conversion table for converting G codes in the first NC data into G codes in the second NC data and an M-code conversion table for converting M codes in the first NC data into M codes in the second NC data,

detecting at least one of a G-code and an M-code in the first NC data, and

converting the detected code in the first NC data to a corresponding code in the second NC data in accordance with said conversion table.

4,890,235

COMPUTER AIDED PRESCRIPTION OF SPECIALIZED SEATS FOR WHEELCHAIRS OR OTHER BODY SUPPORTS

Steven I. Reger, Shaker Heights; Donald C. Neth, Parma, and Thomas F. McGovern, Cleveland Heights, all of Ohio, assignors to The Cleveland Clinic Foundation, Cleveland, Ohio

Filed Jul. 14, 1988, Ser. No. 219,606

Int. Cl.[4] G06F *15/46*

U.S. Cl. 364—468 20 Claims

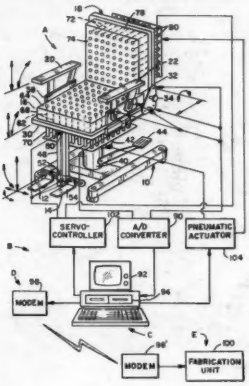
1. A selective force distribution system comprising:

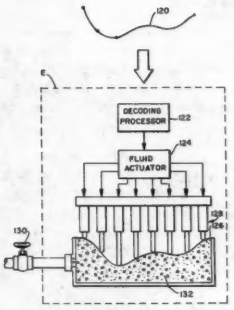
a surface means adapted for deforming in accordance with an associated object placed in force contact therewith;

sensor means for generating a distribution signal representative of a force distribution along the surface means;

deformation means for selectively varying deformation of the surface means; and

the sensor means further including means for generating an updated distribution signal representative of a modified





force distribution along the surface means incurred as a result of a varied deformation thereof.

4,890,236

METHOD AND APPARATUS FOR AIDING MANUAL INSTRUMENT SETTINGS BY DISPLAYING ESTIMATES OF FUTURE MEASUREMENT RESULTS

Erik Kilk, Rohnert Park; David A. Smith, and Alan W. Schmidt, both of Santa Rosa, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 1, 1988, Ser. No. 176,472

Int. Cl.[4] G01R *23/00*

U.S. Cl. 364—485 20 Claims

1. A swept-tuned test instrument incorporating adjustment of control settings and display of revised trace data in light of the adjustments as a precursor to future measurements, comprising:

an input for receiving an incoming signal;

a swept local oscillator for producing a local oscillator signal;

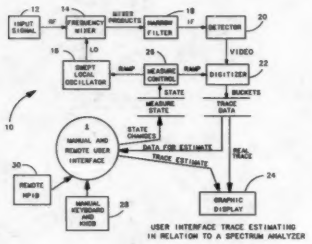
a frequency mixer connected to the input and to the local oscillator for mixing the incoming signal with the local oscillator signal;

an IF filter connected to the mixer for passing a mixing product when the frequency of the mixing product equals a predetermined IF;

a peak detector connected to the filter to detect the passed signal;

a digitizer connected to the peak detector for sampling and storing the detected signal to form trace data;

a display device connected to the digitizer and responsive to the trace data to cause a vertical deflection on the display device;



USER INTERFACE TRACE ESTIMATING IN RELATION TO A SPECTRUM ANALYZER

a measure control circuit connected to the local oscillator and the display device for driving the horizontal deflection of the display device and tuning the local oscillator; and

means connected to the measure control circuit for adjusting a control setting for measurement of the incoming signal;

said measure control circuit being responsive to adjustment of the control setting and the stored trace data for displaying an approximation of a future measurement.

4,890,237

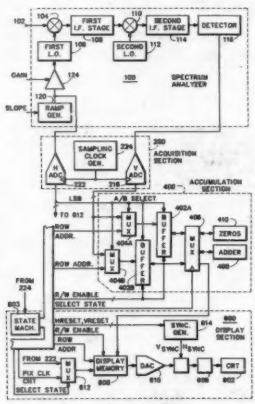
METHOD AND APPARATUS FOR SIGNAL PROCESSING

Robert W. Bales, and Lynn T. Olson, both of Portland, Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Continuation of Ser. No. 78,145, Jul. 27, 1987, abandoned. This application May 25, 1989, Ser. No. 357,629

Int. Cl.[4] G01R *23/16*

U.S. Cl. 364—485 **12 Claims**



1. A method of processing a signal to display a selected property of the signal as a function of an independent variable comprises the steps of:

resolving the independent variable into m intervals;

resolving a range of values for the selected property into n slices;

obtaining a plurality of samples of the signal for each interval;

accumulating for each interval the number of samples having a value for the selected property within each slice; and

displaying for each interval the slices within which samples were accumulated, the intensity of the display for each such slice being a function of the number of samples accumulated in such slice.

4,890,238

METHOD FOR PHYSICAL VLSI-CHIP DESIGN

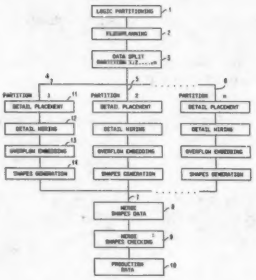
Klaus Klein, Sindelfingen; Kurt Pollmann, Altdorf; Helmut Schettler, Dettenhausen; Uwe Schulz, Boeblingen; Otto M. Wagner, Altdorf, and Rainer Zuehlke, Leonberg, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 15, 1987, Ser. No. 133,402

Claims priority, application European Pat. Off., Dec. 17, 1986, 86117601.4

Int. Cl.[4] G06F *15/60*

U.S. Cl. 364—491 **6 Claims**



1. A method for the physical design of a chip, said chip being divided into several partitions and containing a high number of electrical circuits wherein connections exist between partitions, which method includes the steps of

logically dividing into partitions the circuits to be placed on said chip,

determining space requirements of said partitions and placing said partitions onto different areas of said chip,

determining logic as well as crossing, ending and emerging connection lines within a given partition by treating connection lines within said given partition in the same way as circuits therein, and repeating this step sequentially for adjacent partitions until all partitions have been processed, at least some of said processed partitions having circuit densities that differ from others of said processed partitions,

shaping the processed partitions into various shapes so that they fit to each other without leaving space in between the neighboring edges of said adjacent partitions,

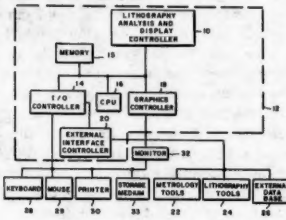
determining interconnect contact points at the boundaries of said partitions by starting in one specific area of the chip and propagating step-by-step in a given direction to form exit information and contact areas of one of said partitions as the input information or placement respectively for the successive adjacent partition or partitions respectively, and

abutting on said chip the appropriately shaped partitions so that each of said partitions is positioned seamlessly to another of said partitions.

4,890,239
LITHOGRAPHIC PROCESS ANALYSIS AND CONTROL SYSTEM

Christopher P. Ausschnitt, Cambridge; Edward A. McFadden, Midford, both of Mass., and Raul V. Tan, San Jose, Calif., assignors to Shipley Company, Inc., Newton, Mass.

Filed Oct. 20, 1987, Ser. No. 110,905
Int. Cl.[4] G06F *15/46;* G21K *5/04;* H01J *37/302*
U.S. Cl. 364—491 **12 Claims**



1. A lithographic process analysis system comprising:
memory means for storing feature width, exposure and focus data;
means for receiving feature width, exposure and focus data and for supplying said data to said memory means;
processor means for determining the best fit of said data on a critical dimension model to identify a best fit model;
means for displaying said best fit model of said data on a three dimensional graph whose axes are feature width, exposure and focus.

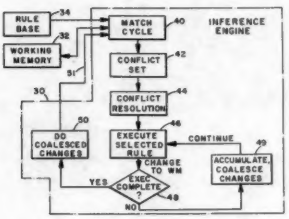
11. A method for controlling a lithographic process comprising:
determining an optimal exposure setting and a largest available window in focus and exposure by best fitting experimental focus, exposure and feature width data onto a critical dimension model, said model including an equation defining exposure latitude;
receiving feature width measurements from the lithographic process being controlled;
determining the minimum and maximum feature widths received over a period of time;
determining maximum and minimum effective exposures from said minimum and maximum feature widths and said exposure latitude equation;
providing a correction signal to a lithographic tool to correct for a shift in the midpoint between maximum and minimum exposure away from said optimal exposure setting.

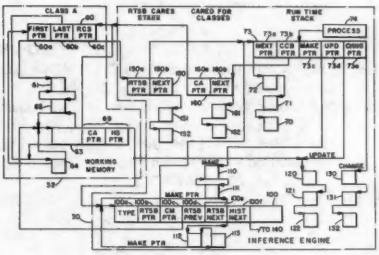
4,890,240
COALESCING CHANGES IN PATTERN-DIRECTED, RULE-BASED ARTIFICIAL INTELLIGENCE PRODUCTION SYSTEMS

David J. Loeb, Campbell, Calif., and Keith R. Milliken, Croton Falls, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 20, 1988, Ser. No. 247,037
Int. Cl.[4] G06F *15/18*
U.S. Cl. 364—513 **8 Claims**

1. A method for coalescing changes to objects in a working memory, the method being invoked prior to processing said changes through a matching structure used in conflict set resolution, said resolution occurring during the recognize-act cycle of a rule-based, artificial intelligence production system, said system including a rule set and an inference engine cooperating with said rule set and working memory for executing a succession of recognize-act cycles, each rule having pattern indication and action specifying parts thereof, the action specifying part of a rule including procedures for effecting changes to said objects,
said method comprising the steps of:
responsive to a first change to an object resulting from execution of a first rule, creating a control block (CB) internal to the inference engine and recording said first change in the created CB;
enqueueing said CB in a queue;





in the event of a second change to said object subsequent to said first change and prior to the selection of the next rule following said first rule, maintaining said CB unaltered in said queue, without passing either said first or said second changes through said matching mechanism; and
upon completing said execution of said first rule, passing the change recorded in said CB through said matching mechanism.

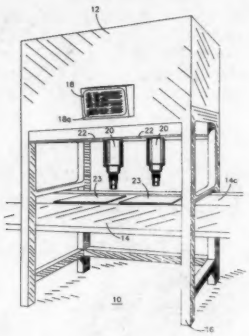
4,890,241
ROBOTIC SYSTEM

Brian D. Hoffman, Somerville, N.J., and Steven H. Pollack, Washington Crossing, Pa., assignors to Megamation Incorporated, Lawrenceville, N.J.

Filed Oct. 26, 1987, Ser. No. 112,534
Int. Cl.[4] G06F *9/00*
U.S. Cl. 364—513 **41 Claims**

1. A system for simultaneously performing a plurality of functions comprising:
a work surface having a plurality of sites for supporting work pieces;
a plurality of robots each being movable in mutually perpendicular directions along a common surface positioned adjacent to said work surface;
a plurality of feeder stations for dispensing items at an outfeed location accessible to said robots;
said robots including means for picking up an item from a

feeder station and for releasing said item upon command; and



means for controlling movement of said robots including means for selecting movement paths to avoid collisions between and among said robots.

4,890,242

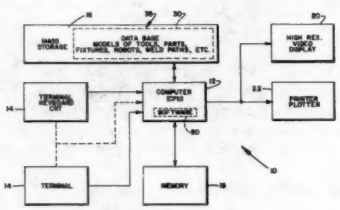
SOLID-MODELING SYSTEM USING TOPOLOGY DIRECTED SUBDIVISION FOR DETERMINATION OF SURFACE INTERSECTIONS

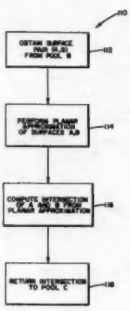
Pradeep Sinha, and Turhan F. Rahman, both of Ithaca, N.Y., assignors to XOX Corporation, Ithaca, N.Y.

Continuation of Ser. No. 871,091, Jun. 5, 1986, abandoned. This application Feb. 9, 1989, Ser. No. 308,975

Int. Cl.[4] G06F *15/60, 15/72*

U.S. Cl. 364—518 **38 Claims**





1. A recursive subdivision process performed in a solid-modeling system including computer means for performing a plurality of functions and storage means for storing data, said process for operating said computer means to identify intersections between the surfaces of a pair of solid models A and B represented by digital data surface descriptions stored in said storage means, said digital data surface descriptions produced by computer-aided design, said models representing, for example, articles of manufacture, machine parts or the path described by the movement thereof through space, each said surface description of each said model subdivided into a plurality of surface patches S each represented by a corresponding digital data surface path description stored in a first pool of surface patch description pairs in said storage means, each said pair including one surface patch description from each of said models A and B, said process for determining by recursive subdivision which said surface patch description pairs in said first pool have a transversal intersection to produce a second pool of surface patch description pairs each known to have a transversal intersection, said process further determining when each of a said pair of surface patch descriptions in said first pool have been subdivided to a limit specified by a predetermined criterion to produce a third pool of surface patch description pairs wherein both surface patch descriptions of said pair are known to meet said predetermined criterion, said process comprising causing said computer means to perform the steps of:

(1) reading said storage means to retrieve from said first pool a pair of digital data patch descriptions representing, respectively a pair of surface patches S_A and S_B of said models A and B;

(2) operating on said retrieved patch descriptions to perform a mutual point exclusion test for said surface patches S_A and S_B and if no mutual points exist terminating further intersection identifying processing on said pair and returning to step 1 to retrieve from said first pool further patch descriptions representing a new pair of surface patches S_A and S_B for processing;

(3) operating on said retrieved patch descriptions to determine if said pair of surface patches S_A and S_B are transversal and if transversal terminating further subdivision of said pair and going to step 6;

(4) operating on said retrieved patch descriptions to test each of said surface patches S_A and S_B against a predetermined criterion and if said criterion is met for both said surface patches classifying said pair in said third pool as having met said criterion whereby the intersection set of said pair can be approximated and terminating further subdivision on said surface patches S_A and S_B and returning to step 1 to retrieve from said first pool further patch descriptions representing a new pair of surface patches S_A and S_B for processing;

(5) operating on said retrieved patch descriptions to subdivide one or both of said surface patches S_A and S_B if they do not meet said predetermined criterion, said patch or patches subdivided into a further plurality of patches to create a plurality of new surface patch pairs representing new patch descriptions, and storing the digital data patch descriptions representing said new pairs in said first pool in said storage means for further processing and returning to step 1 to retrieve from said first pool further patch descriptions representing a new pair of surface patches S_A and S_B for processing; and

(6) operating on said retrieved patch descriptions for said pair of surface patches S_A and S_B determined to be transversal to perform a test to detect intersection between said pair and if an intersection of said pair is detected classifying said pair of surface patches S_A and S_B in said second pool as having a transversal intersection whereby it is known that said pair intersect in a curve if they intersect so that the intersection set can be determined without further subdivision, and returning to step 1 to retrieve from said first pool further patch descriptions representing a new pair of surface patches S_A and S_B for processing.

4,890,243

PERIPHERAL MACHINE FOR PROGRAMMABLE CONTROLLER

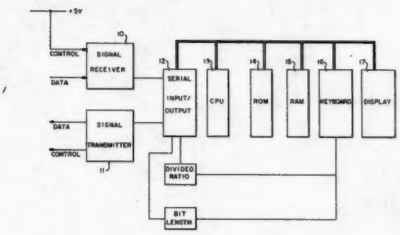
Shinki Yoshida, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 196,854, May 20, 1988, abandoned, which is a continuation of Ser. No. 83,875, Aug. 10, 1987, abandoned, which is a continuation of Ser. No. 749,186, Jun. 26, 1985, abandoned. This application Nov. 14, 1988, Ser. No. 273,175

Claims priority, application Japan, Jul. 3, 1984, 59-101455[U]

Int. Cl.[4] G05B *19/02;* **G06F** *13/20*

U.S. Cl. 364—550 **4 Claims**



1. A peripheral machine for a programmable controller comprising

a signal transmitting means and a signal receiving means connected to a serial input/output signal line of external electronic devices,

a control means connected to said signal transmitting and signal receiving means through a serial input/output means, and

a memory means storing a control program according to which said control means operates selectively either as a programmable controller to transmit data and signals through said signal transmitting means or as a monitor to receive data and signals from said external electronic devices through said signal receiving means, depending upon the level of a signal received through said signal receiving means.

4,890,244

DEVICE FOR INSPECTING THE HEAT INSULATION OF HOUSEHOLD APPLIANCES, MORE PARTICULARLY REFRIGERATORS

Dino Baggio, Pordenone, and Antonio Boscolo, Trieste, both of Italy, assignors to Zeltron - Instituto Zanussi per la Ricerca S.p.A., Udine, Italy

Filed Jul. 9, 1987, Ser. No. 72,844

Claims priority, application Italy, Jul. 9, 1986, 45735 A/86

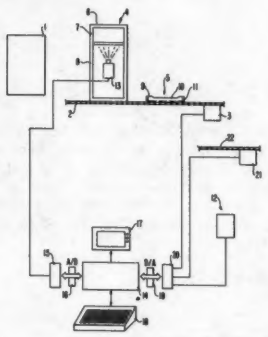
Int. Cl.[4] G01K *1/16;* **G06F** *15/20*

U.S. Cl. 364—551.01 **32 Claims**

1. In a plant for manufacturing a product including insulation material, said plant including means for forming the insulation material by foaming a polyurethane or similar material, thereby causing an exothermic reaction, and transport means for moving the product through said plant during the manufacture thereof, the improvement comprising means for inspecting the insulation characteristics of the insulation material, said inspecting means comprising:

thermographic means to be directed toward the product for, during said foaming, detecting a heat image of said insulation material as a function of said exothermic reaction and for generating detected coded data representative thereof;

processing and control means containing reference coded data representative of a heat image of insulation material of acceptable insulation characteristics and operatively connected to said thermographic means for receiving said detected coded data therefrom, for comparing said detected coded data with said reference coded data, and for generating coded response data as a function of such comparison; and



said processing and control means being operatively connected to said transport means for controlling the operation of said transport means as a function of said coded response data.

4,890,245

METHOD FOR MEASURING TEMPERATURE OF SEMICONDUCTOR SUBSTRATE AND APPARATUS THEREFOR

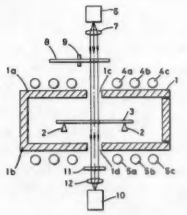
Masahiko Yomoto, Kawasaki; Makoto Uehara, Tokyo; Hajime Ichikawa, Yokohama, and Shigeru Kato, Hoya, all of Japan, assignors to Nikon Corporation, Tokyo, Japan

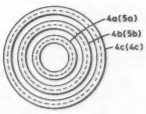
Filed Sep. 17, 1987, Ser. No. 99,297

Claims priority, application Japan, Sep. 22, 1986, 61-224618; Dec. 27, 1986, 61-311611; Apr. 28, 1987, 62-105634

Int. Cl.[4] G06F *15/00;* **G01S** *5/62*

U.S. Cl. 364—557 **23 Claims**





1. An apparatus for detecting the temperature of a substrate, comprising:

(a) support means for supporting said substrate;

(b) irradiation means for irradiating said substrate, supported by said support means, with infrared light;

(c) control means for controlling the irradiation of infrared light by said irradiation means onto said substrate;

(d) intensity detection means positioned opposite to said irradiation means with respect to said substrate supported by said support means, and adapted to detect the intensity of infrared light from said substrate, thereby generating an output corresponding to the intensity of thus detected infrared light; and

(e) temperature detection means for detecting the temperature of said substrate, on the basis of a first output of said intensity detection means when said substrate is irradiated by the infrared light from said irradiation means and a

second output of said intensity detection means when said substrate is not irradiated by the infrared light from said irradiation means.

4,890,246

ELECTRONIC BALANCE WITH CALIBRATING SYSTEM

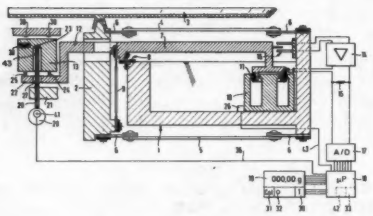
Christian Oldendorf, Göttingen; Christoph Berg, Adelebsen, and Franz-Josef Melcher, Hardegsen, all of Fed. Rep. of Germany, assignors to Sartorius GmbH, Fed. Rep. of Germany

Filed Nov. 19, 1987, Ser. No. 122,696

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1986, 3639521

Int. Cl.[4] G01G *3/18, 23/01*

U.S. Cl. 364—567 **12 Claims**



1. An electronic balance scale having a built-in calibrating system comprising:

a weight-measured value sensor,

a temperature sensor having a real time digital output,

a built-in calibrating weight, said weight being operably moved into a sole-weight-to-be-measured position upon an initiation of a calibration event,

a microprocessor/digital signal processing unit,

said unit comprising:

a mathematical computation unit,

a memory unit having a plurality of memory areas for storing at least magnitudes, including a first, second, third, a preset-difference memory area, and at least one other memory area,

a comparator unit to compare the magnitude of a first memory area compared to that of a second memory area and indicate in a third memory area which magnitude of said first and second memory areas is larger and by what magnitude of difference,

a memory with a built-in program of instructions,

a calibration factor stored in one of said other memory areas,

said factor computed at an initiation of a calibration event utilizing only said built-in calibrating weight,

said digital output of said temperature sensor being inputted into said second memory area, said first memory area storing the temperature digital output of said temperature sensor at the occurrence of the last calibration event,

a display and operating panel having an actuatable signal element,

said signal processing unit under control of said program continuously reading said temperature sensor, and by said comparator unit comparing a temperature at said sensor as stored at said second memory area with a temperature as stored at said first memory area and if said difference is greater than a number stored at said preset difference memory area then said signal element is actuated indicating that a new calibration event utilizing only said built-in calibrating weight should be initiated.

4,890,247

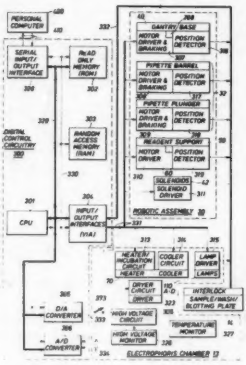
AUTOMATIC ELECTROPHORESIS APPARATUS AND METHOD

Robert J. Sarrine, Beaumont; Henry A. Garsee, Kountz; Charles D. Kelley, Beaumont, and Philip A. Guadagno, Vidor, all of Tex., assignors to Helena Laboratories Corporation, Beaumont, Tex.

Division of Ser. No. 26,465, Mar. 16, 1987, Pat. No. 4,810,348. This application Jun. 27, 1988, Ser. No. 211,761

Int. Cl.[4] C25B *9/00*

U.S. Cl. 364—571.04 **2 Claims**



1. In a system including a scanning box substantially enclosing a plate for placement of a support medium, said support medium having a plurality of laterally spaced sample tracks extending longitudinally across said medium, said system having fluorescent light means secured within said box for fluorescently lighting said support medium and having an imaging device directed toward said support medium for generating video signals representative of the light intensity of said support medium, said system further including computer means responsive to said video signals for storing a pixel matrix of intensity levels of said video signal, a method for producing a correction matrix for correcting said imaging device for non-linear imaging effects comprising the steps of,

placing a test support medium on said plate,

illuminating said test support medium with said fluorescent light means,

generating video signals representative of the light intensity of the surface of said test support medium,

storing in said computer means a pixel matrix of intensity levels of said video signals of said test support medium,

separating said pixel matric into a plurality of longitudinal tracks each comprising a plurality of pixel rows corresponding to said sample tracks,

averaging the lateral intensity pixels for each track for each longitudinal position of the matrix and storing an average intensity matrix including an average intensity pixel value for each track at each longitudinal position of the matrix,

identifying from said average intensity matrix the track pixel having the greatest average intensity value, and

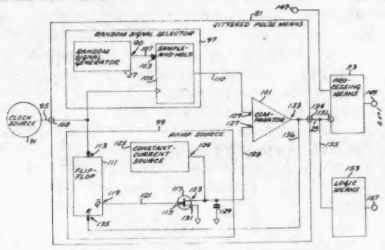
dividing each track average pixel intensity value into said greatest average intensity value and replacing each intensity value of said average intensity matrix with the result of each such division to create said correction matrix for correcting said imaging device for non-linear imaging effects.

4,890,248

METHOD AND APPARATUS FOR REDUCING ALIASING IN SIGNAL PROCESSING

Victor S. Reinhardt, Rancho Palos Verdes, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jun. 1, 1987, Ser. No. 56,195
Int. Cl.[4] H04L 27/12; G06F 1/02
U.S. Cl. 364—574 57 Claims



1. An aiias reducing signal processing apparatus comprising:

jittered pulse means, operative to provide a sequence of jittered pulses, each pulse occurring during one of a sequence of time intervals of duration T at a time determined by a sequential one of a set of independent random numbers having a uniform probability density in a region bounded by zero and T; and

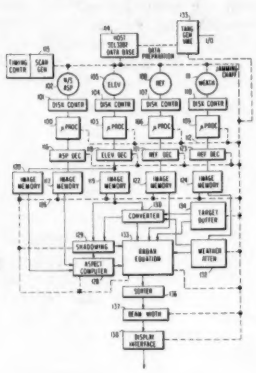
processing means, in electrical communication with the jittered pulse means, operative to perform a signal processing operation in response to the jittered pulses.

4,890,249

DATA COMPRESSION AND DECOMPRESSION FOR DIGITAL RADAR LANDMASS SIMULATION

Craig S. Yen, Fairfax County, Va., assignor to Hughes Simulation Systems, Inc., Herndon, Va.

Filed Mar. 16, 1988, Ser. No. 168,768
Int. Cl.[4] G06F 3/153, 15/66
U.S. Cl. 364—578 12 Claims



5. A digital radar landmass simulator comprising:

first, second and third channels for storing respectively compressed aspect, elevation and reflectivity data and synchronously and continuously retrieving and decompressing said compressed data in real time, each of said channels including a microprocessor operating as a channel controller, the microprocessors of said channels being connected to a common bus, one of said microprocessors being a master microprocessor and maintaining synchronism of said channels;

means for generating a scan and depression angles and computing radar incident vectors;

aspect computer means connected to said first channel and responsive to decompressed aspect data for processing the data to produce surface normals and calculating vector dot products between said radar incident vectors and the surface normals to generate radar aspect returns;

shadowing and converter means connected to said second channel and responsive to decompressed elevation data for calculating shadowing due to elevation and slant range as a function of ground range;

radar equation means connected to said third channel, said aspect computer means and said shadowing and converter means and responsive to decompressed reflectivity data, said calculated radar aspect returns, shadowing and slant range for calculating terrain radar returns; and

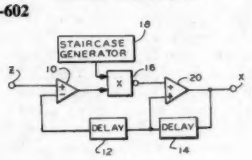
display means connected to said radar equation means and responsive to said calculated terrain radar returns for displaying a simulated radar image.

4,890,250

HYBRID ESTIMATING FILTER

Steven Levin, 3 Woodlawn Dr., Morristown, N.J. 07960

Filed Nov. 18, 1988, Ser. No. 273,051
Int. Cl.[4] H04B 3/04
U.S. Cl. 364—602 12 Claims



1. A filter for estimating the signal in an observed input having signal and noise, comprising:

a sequencing clock for providing a clock signal;

level means having an input terminal and an output terminal for providing on said output terminal a rescaled output being related by a variable proportion to the input on said input terminal, said level means being coupled to said sequencing clock and being operable in response to clock signal to repetitively change the variable proportion said input terminal and said output terminal; and

feedback means coupled between said output terminal and said input terminal of said level means for applying to said input terminal an input proportional to the difference between the observed input and the output on said output terminal.

4,890,251

ARITHMETIC SHIFTER WITH SIGN EXTEND FACILITY

Yasuhiko Nitta, and Kazuo Nakamura, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Feb. 24, 1988, Ser. No. 159,869
Claims priority, application Japan, Jun. 30, 1987, 62-164331
Int. Cl.[4] G06F 7/38
U.S. Cl. 364—715.08 6 Claims

1. A shifter for shifting first data by a bit width specified by second data, said shifter comprising:

first inverter means for inverting respective bits of said first data to provide third data only if the most significant bit of said first data is predetermined data;

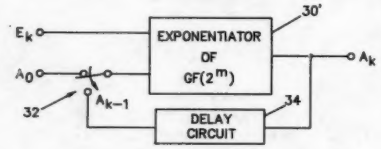
a shifter array for shifting said third data by a bit width specified by said second data to provide fourth data; and second inverter means for inverting respective bits of said fourth data only if said most significant bit of said first data is said predetermined data, to provide output data.

4,890,252

LONG PERIOD PSEUDO RANDOM NUMBER SEQUENCE GENERATOR

Charles C. Wang, Arcadia, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Oct. 29, 1987, Ser. No. 113,954
Int. Cl.[4] G06F *1/02*
U.S. Cl. 364—717 **5 Claims**



1. A circuit for generating a sequence of pseudo random numbers, $\{A_k\}$, comprising:

(a) an exponentiator in GF(2^m) for the normal basis representation of elements in a finite field GF(2^m) each represented by m binary digits and having two inputs and an output from which the sequence $\{A_k\}$ of pseudo random numbers is taken, one of said two inputs being connected to receive the outputs $\{E_k\}$ of a maximal length shift register of n stages;

(b) a switch having a pair of inputs and an output, said output of said switch being connected to the other of said two inputs of said exponentiator, one of said inputs of said switch being connected for initially receiving a primitive element A_0 in GF(2^m); and

(c) a delay circuit having an input and an output, said output of said delay circuit being connected to the other of said switch inputs, said input of said delay circuit being connected to said output of said exponentiator whereby after said exponentiator initially receives said primitive element A_0 in GF(2^m) through said switch, said switch is switched to make said exponentiator receive as an input thereto a delayed output A_{k-1} from said exponentiator thereby generating $\{A_k\}$ continuously at said output of said exponentiator.

4,890,253

PREDETERMINATION OF RESULT CONDITIONS OF DECIMAL OPERATIONS

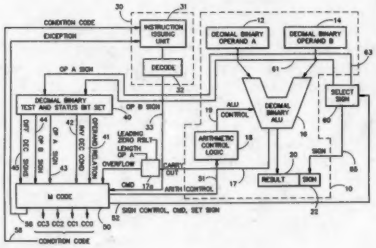
John D. Jabusch, Endwell; Linda A. Kovacs; Timothy G. Plzak, both of Endicott, and Robert R. Richardson, Vestal, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 28, 1988, Ser. No. 291,556
Int. Cl.[4] G06F *15/00*
U.S. Cl. 364—736.5 **5 Claims**

1. In a computer arithmetic unit responsive to an exception-interrupted, branched instruction stream for combining two packed, signed, decimal binary operands, A and B, to produce a packed, signed, decimal binary result, each operand including n hexadecimal digits, each of the hexadecimal digits having a plurality of bits, n−1 of the hexadecimal digits of each operand representing the operand's magnitude, 1 hexadecimal digit of each operand representing the operand's sign, said computer arithmetic unit including an instruction issuing unit which interrupts said instruction stream in response to an exception interruption, a result condition status apparatus for indicating result conditions of the outcome of an "ADD" class operation combining said operands, said apparatus comprising:

comparative magnitude means connected to said arithmetic unit for logically combining bits of the magnitude digits of said operands to produce a first result condition signal indicating the comparative magnitude of said operands;

validity determining means connected to said arithmetic unit and to said instruction issuing unit for logically combining bits of the magnitude digits and bits of the sign digits of said operands to produce a second result condition signal, said second result signal being provided to said instruction issuing unit, said second result condition signal conditioned by said validity determining means to cause exception interruption of said instruction stream if said bits of the magnitude digits or said bits of the sign digits indicate either of said operands is invalid;



signs means connected to said arithmetic unit for logically combining bits of the sign digits of said operands to produce a third result condition signal indicating the equivalence or non-equivalence of the signs of said operands; and

result sign selection means connected to said comparative magnitude means and to said sign means and responsive to said first and third result condition signals for selectively providing either the sign digit of operand A or the sign digit of operand B as the sign of said result.

4,890,254

CLOCK DISABLING CIRCUIT

Bradford S. Cooley, Richardson, Tex., assignor to Aristacom International, Inc., Alameda, Calif.

Continuation of Ser. No. 024,993, Mar. 11, 1987, abandoned. This application Jul. 21, 1989, Ser. No. 384,875
Int. Cl.[4] G06F *9/00*
U.S. Cl. 364—900 **21 Claims**

1. Apparatus to transfer data between a first processor and a second processor comprising:

a system clock for generating clock pulses to the second data processor;

a memory for storing data transmitted from the first data processor;

means for generating a signal indicating that said memory is empty; and

means for stopping said system clock in response to said signal from said means for generating indicating that said

memory means is empty to prevent the second processor from accessing said memory.

4,890,255

DATA PROCESSING DEVICE FOR SIMULTANEOUSLY ACTIVATING AND APPLYING PARALLER TRAINS OF COMMANDS TO MEMORIES FOR STORING MATRICES

Jean-Philippe Lehmann, 28, rue des Pecheurs, 13007 Marseille, and Patrick Isoardi, 7, rue du Marechal Leclerc, 67640 Fegersheim, both of France

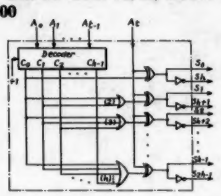
PCT No. PCT/FR85/00378, § 371 Date Sep. 2, 1986, § 102(e) Date Sep. 2, 1986, PCT Pub. No. WO86/04167, PCT Pub. Date Jul. 17, 1986

PCT Filed Dec. 30, 1985, Ser. No. 913,678

Claims priority, application France, Dec. 31, 1984, 84 20185

Int. Cl.[4] G06F *12/02, 15/347*

U.S. Cl. 364—900 **16 Claims**



Device DCh

1. A device for generating commands for data processing, information storage and memory, for activating, from within a set of K.L output commands organized in a matrix having L lines and K columns of command input wires, a predetermined number of commands forming a submatrix of said matrix of K.L commands of up to h columns and up to h' lines responsive to an externally applied selection signal defining the position of the submatrix in said matrix of commands, a submatrix of not more than hh' commands being activated simultaneously and in parallel, regardless of the position of the submatrix therein, wherein h,h', K and L are numbers such that $4 \leqq 2h \leqq K$ and $4 \leqq 2h' \leqq L$,

the device comprising:

a set of K.L command means having respective outputs, interconnecting said K column wires ordered from 0 to K−1 and referenced as $S_0, \ldots, S_j, \ldots, S_{K-1}$, and L said line wires ordered from 0 to L−1 and referenced as $S'_0, \ldots, S'_i, \ldots, S'_{L-1}$, where h, K and L are numbers such that $4 \leqq 2h \leqq K$ and $L \geqq 2$, in accordance with logic functions (S'_i AND S_j) performed by said command means, with the outputs of said means forming the set of K.L matrix-organized output commands;

first activation means for each said up to h column commands for selecting and activating in parallel a first column command and subsequently up to h−1 column commands in response to a first address signal applied thereto from a first input address bus $A^+, A_{k-1} \ldots A_{t-1} \ldots A_0$, where $K = 2^k$, said first address signal representing a first portion of the selection condition and designating said first column commands to be activated; and

second activation means for each said up to h' line commands for selecting and activating in parallel a first line command and subsequently up to h'−1 line commands in response to a second address signal applied thereto from a second input address bus $A'^+, A'_{l-1} \ldots A'_{t-1} \ldots A'_0$, where $L = 2^l$, said second address signal representing a second portion of the selection condition designating said first line command to be activated, said second address signal applied simultaneously with the application of said first address signal to the first activation means.

4,890,256

DOCUMENT EDITING APPARATUS HAVING DOCUMENT COLLATOR FUNCTION

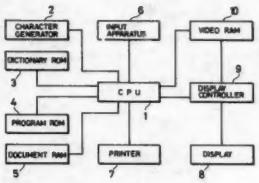
Hideki Sasaki; Shigeru Matsuoka, both of Hitachi; Eiji Matsuda, Takahagi; Hitoshi Yonenaga, and Masahito Fukushima, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 9, 1987, Ser. No. 130,658

Claims priority, application Japan, Dec. 15, 1986, 61-296722

Int. Cl.[4] G06F *15/20*

U.S. Cl. 364—900 **10 Claims**



1. A document editing apparatus including:

inputting means for inputting a character code and controlling code;

displaying means for displaying the character code and the controlling code inputted by said inputting means; and

controlling means, connected to said inputting means and said displaying means, for editing and writing out a document in accordance with the character code and the controlling code inputted by said inputting means and for displaying an already inputted document on said displaying means;

wherein a check up key and a check up display speed key are provided respectively on said inputting means, wherein check up display controlling means, is included in said controlling means, for displaying a character line of the already inputted document with a continuous shifting on said displaying means in accordance with an input of said check up key, and wherein check up display speed controlling means, is further included in said controlling means, for changing a check up display speed at said displaying means in accordance with the input of said check up display speed key.

4,890,257

MULTIPLE WINDOW DISPLAY SYSTEM HAVING INDIRECTLY ADDRESSABLE WINDOWS ARRANGED IN AN ORDERED LIST

Tefcros Anthias, Romsey; John A. Herrod, Eastleigh, and George M. Trees, Hursley, all of England, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 10, 1987, Ser. No. 37,281

Claims priority, application United Kingdom, Jun. 16, 1986, 8614617

Int. Cl.[4] G06F *3/14*; G09G *1/06*

U.S. Cl. 364—900 **13 Claims**

1. A multiple window display system comprising:

a display device capable of displaying a plurality of display areas, each display area representing data;

at least one presentation buffer for storing data corresponding to at least two windows, each window corresponding to at least one display area, each window having a unique window location in the presentation buffer;

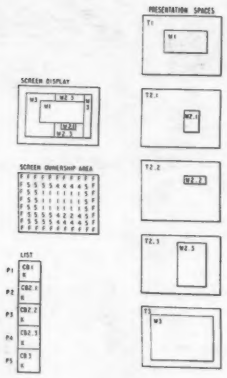
an ordered list memory, said ordered list memory comprising a plurality of locations having sequentially numbered addresses, each address being a window identity code for identifying windows, the order of the window identity codes representing window priorities ranging from lower priority to higher priority;

a screen ownership memory having memory locations, each

memory location corresponding to a display area, each memory location containing screen ownership data, the screen ownership data in each memory location comprising a single window identity code; and

processor means for

(a) first reading the window identity code representing the lower priority window and storing that window identity code in locations of the screen ownership memory corresponding to each display area corresponding to the lower priority window; and then



(b) reading the window identity code representing the higher priority window and storing that window identity code in locations of the screen ownership memory corresponding to each display area corresponding to the higher priority window;

characterized in that:

a first location of the ordered list memory contains location data representing the location of a first window in the presentation buffer.

4,890,258

SCHEDULE SETTING METHOD

Shinji Tsugei; Shigeki Iguchi, and Tomohiro Inoue, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 743,685, Jun. 11, 1985, abandoned. This application Apr. 14, 1988, Ser. No. 183,500
Claims priority, application Japan, Jun. 11, 1984, 59-119642
Int. Cl.[4] G06F *9/00*
U.S. Cl. 364—900 **3 Claims**

1. A schedule setting device comprising:

a schedule display containing predetermined schedule information, said predetermined schedule information including a time line and a date line perpendicularly arranged to create an input matrix;

said input matrix including a time information zone and a comment information zone provided for each of a plurality of dates on said date line;

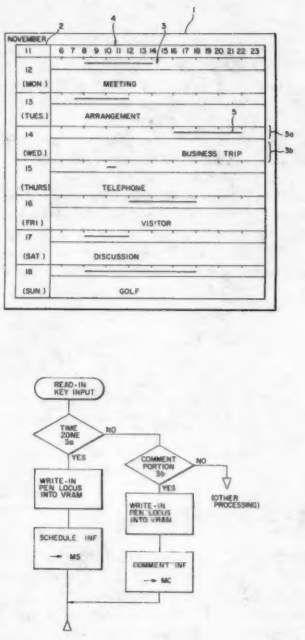
a digitizer;

a liquid crystal display panel superimposed on said digitizer, said liquid crystal display panel being provided for bearing said time and information zones;

means for inputting handwritten time information corresponding to a desired alarm time into said time information zone;

means for inputting handwritten comment information into said comment zone;

means for determining the arrival of said desired alarm time; and



means for developing an alarm signal upon determining the arrival of said desired alarm time.

4,890,259

HIGH DENSITY INTEGRATED CIRCUIT ANALOG SIGNAL RECORDING AND PLAYBACK SYSTEM

Richard T. Simko, Los Altos Hills, Calif., assignor to Information Storage Devices, Los Altos Hills, Calif.

Filed Jul. 13, 1988, Ser. No. 218,634
Int. Cl.[4] G11C *7/00, 11/40*
U.S. Cl. 365—45 **10 Claims**

1. A memory array for storing analog information comprising:

a plurality of rows and columns of electrically erasable programmable floating gate non-volatile memory cells each adapted for storing an analog signal;

column read/write circuitry coupled to the columns of said memory array for reading the analog signals stored in said memory, and for writing the analog signals into the array,

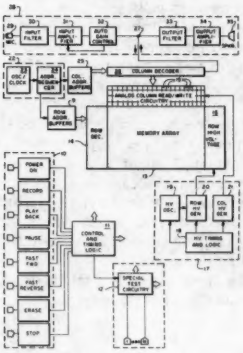
including means for iteratively charging a column of electrically erasable programmable read only memory cells by applying an interative series of write pulses to the selected cell, said write pulses having a predetermined voltage starting from a low voltage and increasing in voltage with time, whereby charging resolution is improved, thereby intelligently adjusting the charge and consequently adjusting the conductivity of a memory cell in direct relation to the voltage of the input signal to be stored;

first and second plurality of sample/hold circuits;

first transfer means coupled to the column read/write circuitry for storing analog input signals on one of said first and second plurality of sample/hold circuits;

second transfer means coupled to said column read/write

circuitry for transferring said analog input signals from said first sample/hold circuit to said array while analog signals are being stored on said second sample/hold circuit; and

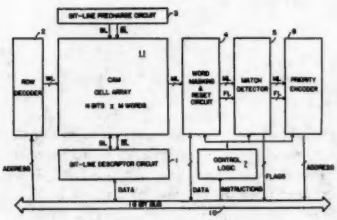


switching means coupled to said first and second transfer means for switching said analog input signals from one of said pluralities of sample/hold circuits to the other for storage when the storage capacity of said first plurality of sample/hold circuits is reached.

4,890,260
CONTENT ADDRESSABLE MEMORY ARRAY WITH MASKABLE AND RESETTABLE BITS

Patrick T. Chuang; Robert L. Yau, both of Cupertino; Hiroshi Yoshida, Santa Clara, and Moon-Yee Wang, Cupertino, all of Calif., assignors to Advanced Micro Devices, Sunnyvale, Calif.

Filed May 11, 1988, Ser. No. 193,312
Int. Cl.[4] G11C *15/00*
U.S. Cl. 365—49 **5 Claims**



1. A content addressable memory array comprising an array of M words, each word containing bits configured in N bits for each word,

a first one of said bits in each of said words being a settable skip bit;

means for searching said array on the basis of the contents of said words to locate selected words;

a second one of said bits in each of said words being a settable empty bit;

means for setting selected ones of said skip bits to a skip condition;

means for examining each of said words to detect the presence therein of a set skip bit therein;

means for setting selected ones of said empty bits to an empty condition;

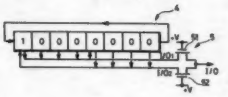
means for examining said each of said words to detect the presence therein of a set empty bit therein; and

means responsive to detection of one of said skip bits in any of said words for eliminating any of said words containing said detected skip bit from said search.

4,890,261
VARIABLE WORD LENGTH CIRCUIT OF SEMICONDUCTOR MEMORY

Hideto Hidaka; Kazuyasu Fujishima, and Yoshio Matsuda, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 14, 1988, Ser. No. 206,417
Claims priority, application Japan, Jun. 16, 1987, 62-149551
Int. Cl.[4] G11C *21/00, 19/00, 8/00*
U.S. Cl. 365—73 **9 Claims**



1. A variable word length circuit of a semiconductor memory for varying a word length of a memory cell array in which a plurality of memory cells are arranged in row and column directions, comprising:

a shift register with stages corresponding to respective bits of said memory cell array, said shift register having a fixed recirculation path with an input of a first stage of the register being connected to an output of the last stage of the register, for selecting a memory cell from among said plurality of cells by circulating successively data stored in said shift register along a path including said fixed circulation path;

means for varying a word length of data accessed from said memory cell array by changing data stored in the stages of said shift register; and

means responsive to said word length varying means for switching an output of said shift register.

4,890,262
SEMICONDUCTOR MEMORY WITH BUILT-IN DEFECTIVE BIT RELIEF CIRCUIT

Masashi Hashimoto, Ami, and Tadashi Tachibana, Tsuchiura, both of Japan, assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jan. 12, 1988, Ser. No. 142,969
Claims priority, application Japan, Jan. 14, 1987, 62-7166
Int. Cl.[4] G11C *7/00, 29/00*
U.S. Cl. 365—200 **7 Claims**

1. A memory device comprising:

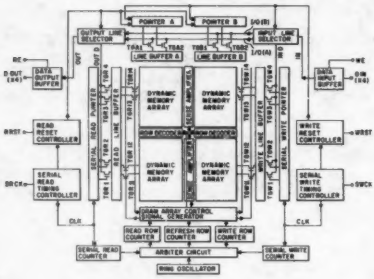
an array of memory cells arranged in rows and columns;

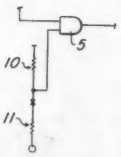
counter means operably connected to said array of memory cells and incrementing in a counting sequence in response to the writing and/or reading of data bits to and/or from said array of memory cells;

said array of memory cells including at least one region thereof containing one or more defective memory cells located in a respective one of said rows and columns of memory cells;

said counter means being provided with an internal memory limiting circuit disconnecting the address of said respective ones of said rows and columns of memory cells containing a defective memory cell; and

said counter means having reset circuit means responsive to the disconnection of the address of said respective ones of said rows and columns of memory cells containing a defective memory cell by said internal memory limiting





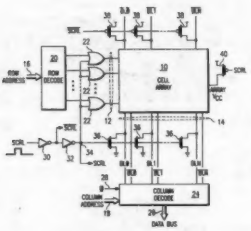
circuit to reset said counter means at the beginning of the counting sequence, whereby said array of memory cells is programmed to employ only rows and columns thereof containing operable memory cells in a data storage and/or data output procedure.

4,890,263

RAM WITH CAPABILITY FOR RAPID CLEARING OF DATA FROM MEMORY BY SIMULTANEOUSLY SELECTING ALL ROW LINES

Wendell L. Little, Carrollton, Tex., assignor to Dallas Semiconductor Corporation, Dallas, Tex.

Filed May 31, 1988, Ser. No. 200,649
Int. Cl.[4] G11C *7/00, 11/40*
U.S. Cl. 365—218 **7 Claims**



1. A static memory array with presettable logic states, comprising:

an array of static memory cells arranged in rows and columns, each of said memory cells having true and complement sense nodes for storing the true and complement, respectively, of a binary logic state, and comprising a first inverter having the input thereof connected to said true sense node and the output thereof connected to said complement sense node, and a second inverter having the input thereof connected to said complement sense node and the output thereof connected to said true sense node;

a plurality of row lines each connected to respective ones of said memory cells in an associated row for activating said associated memory cells;

a plurality of pairs of true and complement bit lines each connected to the true and complement sense nodes, respectively, of respective ones of said memory cells in a respective column, activation of each of said row lines activating the associated one of said memory cells for output of the true and complement logic state to said true and complement bit lines, respectively,

means for activating all of said row lines in response to receiving an external clear signal;

means for forcing said true and complement bit lines associated with each of said memory cells to predetermined mutually complementary logic states during the presence of said clear signal; and

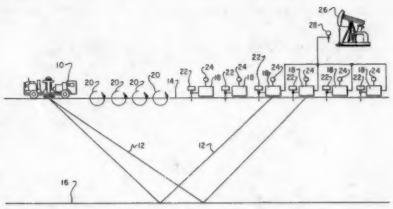
means for disconnecting each of said first and second inverters from said DC supply during the presence of said clear signal.

4,890,264

SEISMIC EXPLORATION METHOD AND APPARATUS FOR CANCELLING NON-UNIFORMLY DISTRIBUTED NOISE

Gary A. Crews, and David R. Martinez, both of Plano, Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Mar. 21, 1988, Ser. No. 171,113
Int. Cl.[4] G01V *1/28*
U.S. Cl. 367—45 **13 Claims**



1. A method of seismic exploration comprising the steps of:

generating and applying seismic waves to the surface of the earth, said waves traveling into the earth and reflecting from formations in the earth and also traveling along the surface of the earth in a nonuniformly distributed manner;

placing a plurality of seismic detectors on the surface of the earth at a plurality of locations spaced on the surface of the earth from the point of application of said seismic waves for receiving said seismic waves reflecting from formations in the earth;

placing at each of said plurality of locations at least one surface wave detector adapted to receive said nonuniformly distributed surface waves;

placing at least one mechanical noise detector adapted to receive mechanical noise signals proximate to a source of nonuniform mechanical noise; and

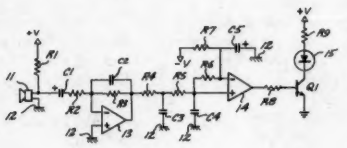
adaptively processing said seismic waves received at each of said plurality of locations in combination with said nonuniformly distributed surface waves received at each of said plurality of locations and said received mechanical noise signal to produce an output signal representative of seismic waves reflecting from formations in the earth.

4,890,265

INFRA-SONIC DETECTOR AND ALARM WITH SELF ADJUSTING REFERENCE

Steven G. Goldstein, Los Angeles, Calif., assignor to Rabbit Systems, Inc., Santa Monica, Calif.

Filed Aug. 3, 1988, Ser. No. 228,530
Int. Cl.[4] G08B *13/22*
U.S. Cl. 367—94 5 Claims



1. An infra-sonic detector and alarm system for detecting intrusion in a monitored air space comprising:

a transducer for sensing instantaneous air pressure variations in the monitored space and producing an electrical pressure variation signal;

amplifier means for amplifying the electrical pressure variation signal;

low pass filter means for passing only infra-sonic portions of the electrical pressure variation signal;

a reference circuit having means for delaying and averaging the instantaneous infra-sonic portions of the electrical pressure variation signal to generate a short term averaged reference signal;

comparator means for comparing the instantaneous infra-sonic signal portions of the electrical pressure variation signal to said short term averaged reference signal for generating a trigger signal when said instantaneous infra-sonic portions exceed the short term averaged reference signal; and

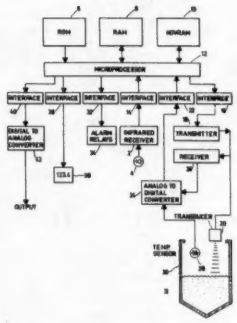
alarm means activated by said trigger signal.

4,890,266

ACOUSTIC RANGE FINDING SYSTEM

Steven J. Woodward, Port Hope, Canada, assignor to Federal Industries Industrial Group Inc., Toronto, Canada

Continuation-in-part of Ser. No. 41,877, Apr. 22, 1987, Pat. No. 4,831,565, which is a continuation-in-part of Ser. No. 916,013, Oct. 3, 1986, Pat. No. 4,821,215. This application May 5, 1988, Ser. No. 190,391
Int. Cl.[4] G01S *15/08*
U.S. Cl. 367—99 16 Claims



1. In an acoustic ranging system comprising at least one electro-acoustic transducer directed towards the surface of material whose level is to be determined, a transmitter to transmit pulses of electrical energy to energize selectively each said transducer whereby to cause it to emit at least one shot of acoustic energy at a predetermined frequency, a receiver receiving and amplifying electrical energy from said at least one shot regenerated by said transducer from acoustic energy at the same frequency received by the transducer over a subsequent period, the time lapse after a shot before receipt by said receiver of energy regenerated from an echo from said surface being proportional to the distance of the origin of the echo, signal processing means comprising analog to digital converter means to sample repeatedly the output amplitude of the signal from the receiver at defined intervals and to digitize the samples; memory means to store an extended sequence of digitized samples so produced in respect of at least one shot and form therefrom a digital data base file depicting an amplitude/time profile of the received signal with a resolution dependent on the sampling intervals; and computing means programmed to utilize the amplitude profile depicted by the data in said data base to help isolate relative to a time axis a portion of the output signal produced by said at least one shot deemed most probable to correspond to a wanted echo, and to determine a range represented by an echo within said portion of the time axis;

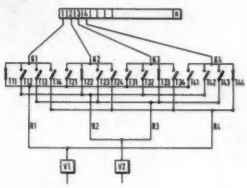
the improvement wherein the computing means is programmed to examine the digital data base file depicting the profile of the received signal to measure the height and width of peaks in the profile, and to modify the profile by removing peaks whose height to width ratio exceeds a predetermined threshold beyond which the ratio is deemed too great for the peak to represent a true echo.

4,890,267

SWITCH MATRIX

Arno Rudolph, Weil der Stadt, Fed. Rep. of Germany, assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Sep. 23, 1986, Ser. No. 910,697
Claims priority, application Fed. Rep. of Germany, Sep. 24, 1985, 85112072
Int. Cl.[4] G01S *15/06*
U.S. Cl. 367—103 8 Claims



1. A switch matrix for providing connections between respective delays and each of m consecutive activated transducers that advance along an array of transducers by activation of a transducer adjacent the m th transducer and the deactivation of the transducer at the other end of the m transducers, comprising:

m consecutive groups of m switches, each switch having a transducer side, a delay side and a control input,

a first set of m leads respectively connected to the transducer sides of all the switches in each group,

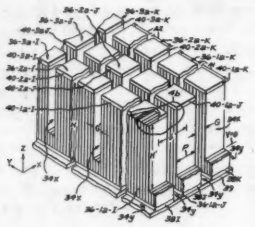
a second set of m leads respectively connected to the delay side of a different switch in each group, and

m control lines, each control line being connected to the control input of only one switch in each group of switches, the delay sides of said switches being respectively connected to said second set of m leads in a given sequence, the sequence for the switches having their control input connected to different control leads starting at a switch in a different group.

4,890,268
TWO-DIMENSIONAL PHASED ARRAY OF ULTRASONIC TRANSDUCERS

Lowell S. Smith, Schenectady; William E. Engeler, Scotia, and Matthew O'Donnell, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 27, 1988, Ser. No. 289,942
Int. Cl.[4] H04B *1/02*
U.S. Cl. 367—138 16 Claims

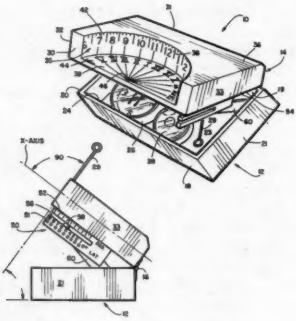


1. A two-dimensional ultrasonic phased array, comprising a multiplicity of ultrasonic transducers arranged in a rectilinear approximation of a two-dimensional oval aperture with a preselected eccentricity; the array arranged with the transducers disposed substantially symmetrical about at least the first axis of the array and also arranged into a plurality 2N of subarrays, each containing at least one transducer, with the subarrays disposed about the first axis with at least one subarrays being juxtaposed to either side of said first axis and with at least one of the subarrays to either side of said first axis having a length, in a first direction substantially parallel to the first axis, different from a length of all other subarrays at an average distance from said first axis greater than the average distance of that at least one subarray; each of the transducers being separately activateable for at least one of transmission and reception of energy, to facilitate both dynamic scanning and focussing in the first direction and at least one of dynamic focussing and dynamic apodization in a second direction, orthogonal to the first direction, of a resulting energy beam.

4,890,269
HELIOCHRON

Robert Buckner, 6423 Coral Lake Ave., San Diego, Calif. 92119, and Mae Morris, 5363 Burford St., San Diego, Calif. 92111

Filed Aug. 7, 1989, Ser. No. 390,294
Int. Cl.[4] G04B *19/26;* G01C *17/34*
U.S. Cl. 368—15 3 Claims

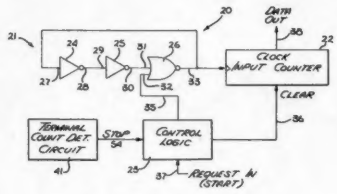


1. A heliochron comprising:
a box-like housing having a bottom wall, a front wall, a rear wall, and laterally spaced side walls, an open top chamber formed in said housing;
a cover having a top wall and a bottom wall;
hinge means securing said cover to said box-like housing;
an elongated latitude scale member having a top edge and a front surface, said top edge being secured to the bottom surface of said cover, a latitude scale imprinted on said front surface, a longitudinally extending slot in said latitude scale member;
an elongated latitude adjustment arm having a front end and a rear end, an index member mounted in said latitude adjustment arm adjacent its front end and extending laterally thereto and received in the slot in said latitude scale member;
means for pivotally securing the rear end of said latitude adjustment arm to the interior of said box-like housing;
an hour scale recess formed in the top wall of said cover, said recess having a vertical semi-circular wall and a horizontal planar surface, an hour scale imprinted on said semi-circular wall to denote hours for the northern hemisphere, an hour scale imprinted on said horizontal planar surface to denote hours for the southern hemisphere;
an elongated gnomon having a top end and a bottom end; and
means for detachably mounting the bottom end of said gnomon at a predetermined point in the horizontal planar surface of said hour scale recess so said gnomon will be at 90 degrees to said planar surface.

4,890,270
METHOD AND APPARATUS FOR MEASURING THE SPEED OF AN INTEGRATED CIRCUIT DEVICE

Scott J. Griffith, Waltham, Mass., assignor to Sun Microsystems, Mountain View, Calif.

Filed Apr. 8, 1988, Ser. No. 179,413
Int. Cl.[4] G04F *8/00;* G01R *15/12*
U.S. Cl. 368—113 17 Claims

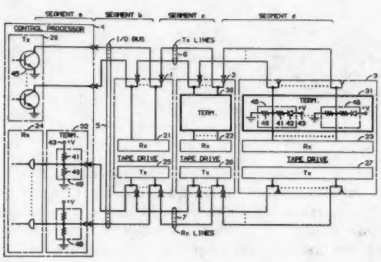


1. A device for measuring the speed of an integrated circuit chip, said chip having located thereon a plurality of electronic circuits, said device comprising:
oscillator means disposed on said chip for producing an oscillating output signal on an output line of said oscillator means;
counter means coupled to said oscillator means for counting the number of oscillations of said oscillator, said counter means producing a counter output signal having a value;
control logic means coupled to said oscillator means and said counter means for selectively enabling said oscillator means and, after a predetermined period of time, disabling said oscillator means.

4,890,271
REDUNDANT TERMINATION OF A COMMUNICATION LINE FOR MAINTAINING THE LINE PROPERLY TERMINATED WHEN ONE OF THE TERMINATIONS IS UNPOWERED

Norbert E. Stohs, Batavia, Ill., assignor to American Telephone and Telegraph Company, New York, N.Y. and AT & T Laboratories, Murray Hill, N.J.

Filed Apr. 12, 1985, Ser. No. 722,657
Int. Cl.[4] H02J 9/00; G11B 5/008
U.S. Cl. 369—24 **8 Claims**



1. A line terminating arrangement for a communication line having a plurality of communication units connected thereto for communicating thereacross, two of the communication units each including its own power source, the terminating arrangement comprising, at only the two units that include their own power sources:

two means each connected to a different one of only the two units which include the power sources, each for coupling the line to the power source of the connected unit to supply the line with a predetermined voltage when the power source of the connected unit is powered up; and

two means each in a different one of the two coupling means for enabling the predetermined voltage to be substantially maintained on the line when the power source of the connected unit is powered down and the other one of the two coupling means is coupling the line to a powered-up power source.

4,890,272
APPARATUS FOR CORRECTING PHOTODETECTOR SIGNALS IN A SYSTEM FOR RETRIEVING INFORMATION FROM AN OPTICAL RECORDING MEDIUM

Hideo Ando, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 18,489, Feb. 25, 1987, abandoned. This application Nov. 16, 1988, Ser. No. 273,750
Claims priority, application Japan, Apr. 30, 1986, 61-42915; Apr. 30, 1986, 61-100746
Int. Cl.[4] G11B 7/00
U.S. Cl. 369—45 **14 Claims**

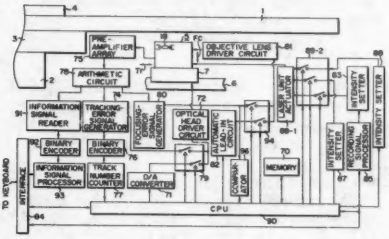
1. A system for retrieving information from an optical recording medium, comprising:

means for emitting a first and a second light beams;

means for converging said first and second light beams onto said optical recording medium, said first and second light beams being reflected from said optical recording medium;

photodetector means having a plurality of photosensitive regions for receiving said first and second light beams reflected from said optical recording medium and for converting said first and second light beams into first and second photoelectric signals, respectively; and

means for generating a correction signal corresponding to said second light beam to correct one of said first and second photoelectric signals produced from one of said plurality of photosensitive regions and for generating a

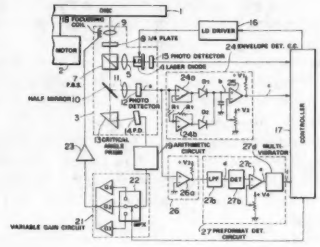


control signal based on one of said first and second photoelectric signals and said corrected one of said first and second photoelectric signals.

4,890,273
OPTICAL INFORMATION RECORDING/REPRODUCING SYSTEM WITH VARIABLE GAIN SERVO ERROR CORRECTION IN RESPONSE TO DETECTED TRACK FORMATS

Toyoaki Takeuchi, Ina, and Yoshiaki Ikeda, Hachioji, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 823,850, Jan. 29, 1986, abandoned. This application Dec. 11, 1987, Ser. No. 133,156
Claims priority, application Japan, Jan. 31, 1985, 60-17556
Int. Cl.[4] G11B 7/09
U.S. Cl. 369—45 **6 Claims**



1. An optical information recording and reproducing system for optically recording information on and reproducing information from an individual recording medium having a plurality of different formats, including at least a prepit part, a groove part before recording data, and a data part after recording data, which are different in the amount of light reflected therefrom or transmitted therethrough in response to different structure of said formats, said system comprising:

an optical pick-up adjustable with respect to said recording medium by at least one of a focusing servo feedback loop and a tracking servo feedback loop, each of said servo feedback loops receiving at least a portion of a received signal reflected from or transmitted through said recording medium and each of said servo feedback loops having variable gain corresponding to each of said plurality of formats and controlled in dependence on said received signals;

format detecting means operatively connected to said optical pick-up for receiving a portion of the received signal therefrom, for detecting each one of said plurality of different formats on said individual recording medium from said received signal; and

controller means connected to said format detecting means and to at least one of said servo feedback loops for varying the gain of said at least one servo feedback loop in response to the detection of each said format by said format detecting means.

4,890,274

OPTICAL INFORMATION RECORDING AND REPRODUCING APPARATUS

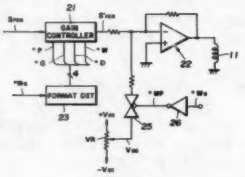
Nobuyuki Kaneko, Kokubunji, and Kiichi Kato, Hachioji, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 852,273, Apr. 15, 1986, abandoned. This application May 20, 1988, Ser. No. 196,827

Claims priority, application Japan, Apr. 16, 1985, 60-81152

Int. Cl.[4] G11B *7/00*; H05J *40/14*

U.S. Cl. 369—45 **6 Claims**



1. An optical information recording and reproducing apparatus, comprising:

an optical system for condensing lights generated in a light source and projecting said lights onto an optical recording medium,

a focus actuator means having a focusing coil and impressing a driving signal on said coil to vary the distance of said optical system from said recording medium to adjust the focus of said optical system,

a focus error detecting means for receiving reflected lights or passing lights in said recording medium to output a focus error signal corresponding to an offset amount from the focus state of said optical system,

a gain controlling means interposed between said focus error detecting means and a driving circuit for receiving a plurality of controlling input signals for variably setting gains and for outputting a driving signal to said focusing coil, and

an offset fluctuation controlling means for controlling a level shift of said driving signal produced on the basis of said focus error signal,

whereby the light emitting output of said light source is varied in response to data to be recorded, the data is written into said recording medium and, at the time of a writing mode, said offset fluctuation controlling means is controlled to hold the offset amount of said driving signal to be fixed.

4,890,275

READING CIRCUIT IN AN OPTICAL DISK APPARATUS

Kunitaka Mori, Tokyo, Japan, assignor to NEC Corporation, Japan

Continuation of Ser. No. 836,399, Mar. 5, 1986. This application Apr. 8, 1988, Ser. No. 183,626

Claims priority, application Japan, Mar. 5, 1985, 60-43489

Int. Cl.[4] G11B *7/00*

U.S. Cl. 369—59 **6 Claims**

1. A reading circuit for an optical disk drive comprising:

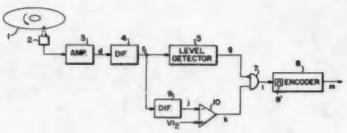
a photo-transducer for optically reading recorded information on an optical disk in the form of a pattern of pits by detecting the presence of such pits, said photo-transducer transforming the optically read information into an electrical read-out signal whose peak of one polarity corresponds to substantially a center of said pit;

first differentiation means for differentiating said read-out signal to generate a first differentiated signal;

zero-level detector means for generating a first rectangular signal in response to whether said first differentiated signal is positive or negative;

pit detecting means for generating a pit detecting signal in response to said read-out signal, which indicates the period of the presence of pits in said read-out signal;

means coupled to said zero-level detector means and said pit



detecting means for generating a combination signal only when a level of said first rectangular signal is changed at the same time said pit detecting signal is generated; and

encoder means for generating a rectangular encoded signal having first and second levels representative of said recorded information, said encoder means changing the level of said rectangular encoded signal from said first level into said second level in response to said combination signal, maintaining said second level during a predetermined constant time period and returning the level of said rectangular encoded signal into said first level after said predetermined constant time period has elapsed.

4,890,276

OPTICAL DISC PLAYER

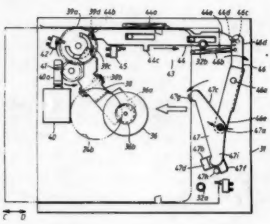
Takuro Ono; Noboru Aoyama, and Kaoru Morinaga, all of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Continuation of Ser. No. 89,337, Aug. 25, 1987. This application Feb. 7, 1989, Ser. No. 307,276

Claims priority, application Japan, Aug. 25, 1986, 61-198426; Aug. 25, 1986, 61-129071

Int. Cl.[4] G11B *17/04, 25/04*

U.S. Cl. 369—77.2 **3 Claims**



1. A disc ejection mechanism for an optical disc player, said optical disc player including a disc compartment in a main chassis for accommodating an optical disc case, said optical disc case being insertable into and ejectable from said disc compartment in an insert direction and an ejection direction, respectively, the apparatus comprising;

a motor;

a gear member including a projection, said gear member being rotatable by said motor;

an ejection slider having a first end and a second end, said first end being engagable by said projection, said ejection slider being translatable along a first direction when said motor is energized to rotate said gear member to bring

said projection into contact with said first end, said first direction lying along an axis between said first and second end of said ejection slider;

a first ejection lever having a first end, a second end and a rotation point between said first and second end, said rotation point being rotatably fixed to said main chassis, said second end of said ejection slider being engagable with said first end of said first ejection lever such that when said ejection slider translates along said first direction said first ejection lever rotates about said rotation point; and

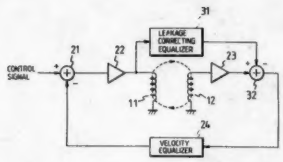
lifting and ejection means for lifting the optical disc case and moving the optical disc case along the ejection direction.

4,890,277

CARRIAGE DRIVING APPARATUS FOR A DISK PLAYER

Kiyoshi Tateishi, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Oct. 18, 1988, Ser. No. 260,087
Claims priority, application Japan, May 24, 1988, 63-126152
Int. Cl.[4] G11B *21/02*
U.S. Cl. 369—219 **5 Claims**



1. A carriage driving apparatus for a disk player, comprising: a carriage carrying a pickup; a driving coil disposed in a magnetic path extending in the radial direction of a disk for driving said carriage in the forward/backward direction of said magnetic path in response to a driving current; a velocity detecting coil disposed in said magnetic path for generating a velocity detection output in accordance with changes in flux; and velocity detection correcting means for correcting said detection output of said velocity coil in accordance with the frequency and intensity of said driving current flowing in said driving coil.

4,890,278

APPARATUS AND METHOD FOR CALIBRATED MONITORING OF OUTPUT VOLTAGE LEVELS OF LOCAL AREA NETWORK COMMUNICATION DEVICES

Michael A. Felker, Rio Rancho; Angelo N. Viverito; John W. Gilstrap, both of Albuquerque; Jesus J. Martos, Tijeras; Ruben Trujillo, Albuquerque, all of N. Mex., and Chang J. Wang, Nashua, N.H., assignors to Digital Equipment Corporation, Maynard, Mass.

Continuation of Ser. No. 123,891, Nov. 23, 1987, abandoned, which is a continuation-in-part of Ser. No. 76,724, Jul. 22, 1987, Pat. No. 4,799,211. This application Jun. 16, 1989, Ser. No. 368,995
Int. Cl.[4] H04J *1/16*
U.S. Cl. 370—17 **19 Claims**

1. Apparatus for measuring transaction signal magnitudes on a cable segment of a local area network, said apparatus comprising:

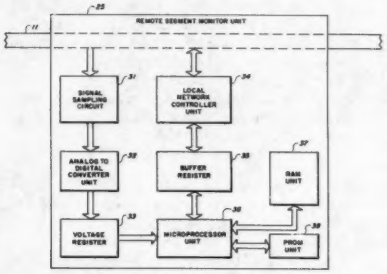
a remote segment monitor unit coupled to said cable segment, said remote segment monitor unit including;

signal determining means coupled to said cable segment for determining a quantity related to a signal magnitude of a network transaction on said cable segment,

signal identification means coupled to said cable segment for providing an identification of a source of said network transaction, and

storage means coupled to said signal determining means and to said signal identification means for storing a quantity related to a signal magnitude and for storing an identification of a signal source for each network transaction, wherein said storage means is coupled to said cable segment;

management means coupled to said local area network for executing procedures, said management means applying a first instruction to said segment, said first instruction causing said remote segment monitor unit to transfer stored quantities and identifications stored in said storage means to said management means; and



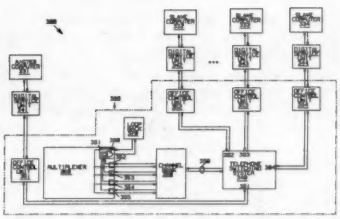
a signal generating unit coupled to said signal determining means for applying a plurality of known signal magnitudes to said signal determining means in response to control signals from said management means, said storage means storing known quantities related to said known signal magnitudes in response thereto, said management means including a comparison procedure for relating stored known quantities determined from said known signal magnitudes with said known signal magnitudes.

4,890,279

MULTIPLEXER AND COMPUTER NETWORK USING THE SAME

Daniel P. Lubarsky, San Jose, Calif., assignor to Pacific Bell, San Francisco, Calif.

Filed Sep. 26, 1988, Ser. No. 249,519
Int. Cl.[4] H04Q *11/04*
U.S. Cl. 370—58.1 **3 Claims**



1. A multiplexer circuit for coupling a plurality of data processors in a computer network such that each data processor receives all data transmitted by the other said data processors, said multiplexer circuit comprising:

a plurality of slave port means, each said slave port means providing means for connecting said multiplexing circuit to a bi-directional communication link, each said slave

port including means for receiving data on said bi-directional communication link and means for transmitting data on said bi-directional communication link;

master port means, connected to each said slave port means, for combining data received by each said slave port means and for transmitting said combined data on a master bi-directional communication link, said master port means further comprising means for receiving data on said master bi-directional communication link and means for coupling the said data received on said master bi-directional communication link to the said transmitting means of each said slave port means; and

loopback means connected to said master port means by said master bi-directional communication link for receiving data transmitted by said master port means on said master bi-directional communication link and for transmitting the data so received on said master bi-directional communication link back to said master port means on said master bi-directional communication link such that said data is received by said master port means on said master bi-directional communication link.

4,890,280

FRAME RELAY TYPE DATA SWITCHING APPARATUS

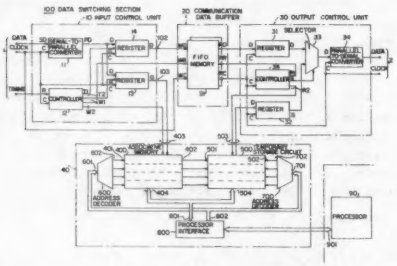
Hideyuki Hirata, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Nov. 14, 1988, Ser. No. 270,025

Claims priority, application Japan, Nov. 11, 1987, 62-286147

Int. Cl.[4] H04Q *11/04*

U.S. Cl. 370—60 **12 Claims**



1. A switching apparatus for updating an incoming logical channel number of logical channel data on an incoming communication channel to an output logical channel number and then delivering the output logical channel number to an outgoing communication channel, said data switching apparatus comprising:

an input control unit for separating a header and communication data which are contained in the logical channel data on the incoming communication channel applied to said input control unit from each other;

an associative memory connected to the input control unit for comparing the header with incoming logical channel numbers registered beforehand and outputting an address control signal associated with an address where any of the incoming logical channel numbers coincident with the header is stored;

a temporary storage circuit for outputting, based on the address control signal, an outgoing logical channel number registered beforehand and associated with the coincident incoming logical channel number;

a communication data buffer connected to the input control unit to receive the communication data separated from the header for temporarily storing the communication data; and

an output control unit for combining the outgoing logical channel number from said temporary storage circuit and the communication data from said communication data buffer and delivering the combined outgoing logical channel number and communication data as logical channel data to said outgoing communication channel.

4,890,281

SWITCHING ELEMENT FOR SELF-ROUTING MULTISTAGE PACKET-SWITCHING INTERCONNECTION NETWORKS

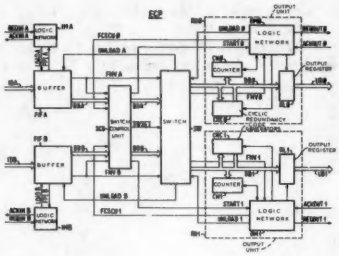
Gian P. Balboni, Turin; Giuseppe Giandonato, Rivalba; Riccardo Melen, Turin, and Vinicio Vercellone, Venaria Reale, all of Italy, assignors to Cselt - Centro Studi E Laboratori Telecomunicazioni S.P.A., Turin, Italy

Filed Nov. 6, 1987, Ser. No. 118,520

Claims priority, application Italy, Nov. 18, 1986, 67854 A/86

Int. Cl.[4] H04J *3/26*

U.S. Cl. 370—60 **14 Claims**



1. A packet-switching element for a selfrouting multistage interconnection network comprising a multiplicity of said elements in respective stages of said network and allowing broadcasting of packets forwarded through the network, each of said elements comprising:

a plurality of element inputs (IDA, IDB) and a plurality of element outputs (UD0, UD1);

an input unit composed of the same number of sections as there are said element inputs for the respective element and having for each of said sections a respective FIFO memory (FIFA, FIFB) for packet buffering before forwarding a packet received at the respective element input toward at least one of said element outputs;

a switch (SW) having a switch control unit (SCU) between said input unit and said element outputs for establishing a connection between one of said element inputs (IDA, IDB) and at least one of said element outputs (UD0, UD1) as determined by information contained in a routing tag associated with each packet and having a first routing tag portion (TAG) and a second routing tag portion (BRD) signalling a normal nonbroadcast routing and broadcasting to different one of said network stages, respectively, and including means for solving possible routing conflicts between packets simultaneously arriving at different element inputs; and

an output unit (RU0, RU1) having as many sections as there are element outputs and each provided with a respective one of said element outputs and being connected to said switch (SW),

said switch control unit (SCU) comprising: broadcasting-request-responsive means (SCUBRD, MANET) for detecting a broadcasting request carried by a respective packet for:

evaluating a possibility of accepting a broadcast request carried by a respective packet by comparing a first parameter representing a number of destination ones of said elements to which the respective packet is to be broadcast with a second parameter representing a position of the stage to which the respective element be-

longs among all stages where broadcasting is requested and indicating a maximum number of outputs of said network which may be potentially seized for broadcasting of a particular message,

accepting said broadcasting request if said first parameter is greater than or equal to said second parameter,

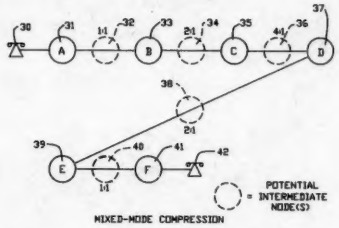
generating, if said request is accepted, a signal (DEFOISA, DEFOISB) for communicating an accepted-request condition to the memory (FIFA, FIFB) storing the packet to be broadcast, and generating at least one modified routing tag for the packet to be broadcast and sending the modified routing tag over a respective one of said element outputs selected for broadcasting, the broadcasting request being processed in one of said elements in a respective one of said stages independently of the processing of other broadcasting requests in others of said elements in the same stage; and

each of said memories (FIFA, FIFB) being provided with means (CTD, CT) responsive to said signal (DEFOISA, DEFOISB) for communicating an accepted-request condition to the memory (FIFA, FIFB) storing the packet to be broadcast and generated by the switch control unit (SCU) of the switch (SW), for effecting actual broadcasting of the respective packet by a plurality of successive readings of the same packet.

4,890,282
MIXED MODE COMPRESSION FOR DATA TRANSMISSION

Maureen K. Lambert, Moss Beach, and Roger P. Chrisman, Portola Valley, both of Calif., assignors to Network Equipment Technologies, Inc., Redwood City, Calif.

Filed Mar. 8, 1988, Ser. No. 165,482
Int. Cl.[4] H04J 3/16
U.S. Cl. 370—79 **25 Claims**



MIXED-MODE COMPRESSION

1. An apparatus for communicating information among a network of stations for sending and receiving the information, comprising:

a plurality of switching nodes;

a plurality of links connecting the switching nodes in a communication network, the links including means for transmitting channels of coded information between neighboring nodes;

at least a first node of the switching nodes comprising,

station port means, coupled to a station in the network, for communicating information to and from the station,

first link port means, coupled to a link in the plurality of links, for communicating information to and from the link,

first connecting means, coupled to the station port means and the first link port means, for connecting information to the station port means or the first link port means for transmission on a selected link in the plurality of links or to a selected station in the network, and

first coding means, including means for performing a plurality of compression algorithms, coupled to the station port means and the connecting means, for coding the information from a station in the network according to a selected one of the plurality of compression algorithms for transmission in one of a plurality of compression modes corresponding to the selected one of the plurality of compression algorithms, the first coding means including means for selecting the selected one of the plurality of compression algorithms in response to a desired compression mode for transmission of the information,

decoding means, including means for performing a plurality of decompression algorithms, coupled to the first link port means and the first connecting means, for decoding information from a compression mode according to a selected one of the plurality of decompression algorithms for communicating to a station in the network, the decoding means further including means for selecting the selected one decompression algorithm in response to the compression mode in which the information is received; and

at least a second node of the switching nodes comprising,

a plurality of second link port means, each coupled to a link in the plurality of links, for communicating information to and from the links,

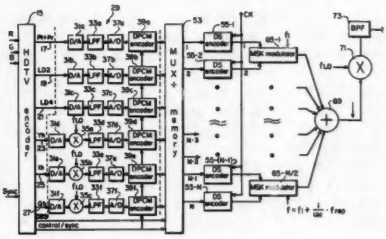
second connecting means, coupled to the plurality of link port means, for connecting information to one of the plurality of link port means for transmission on a selected link coupled to the one of the plurality of link port means, and

second coding means, including means for performing a plurality of compression algorithms coupled to the plurality of second link port means and the connecting means, for coding the information according to a selected one of the plurality of compression algorithms for transmission according to a corresponding compression mode, the second coding means further including means for selecting the selected one compression algorithm in response to the compression mode in which the information is received and the desired compression mode for transmission of the information.

4,890,283
HIGH DEFINITION TELEVISION AUGMENTATION CHANNEL

Mikhail Tsinberg, Riverdale, and Detlev Otto, Peekskill, both of N.Y., assignors to North American Philips Corporation, New York, N.Y.

Filed Nov. 19, 1987, Ser. No. 123,031
Int. Cl.[4] H04J 3/22; H04N 7/12, 11/04
U.S. Cl. 370—84 **12 Claims**



1. An apparatus for transmitting a multiplicity of digital data streams comprising:

bit rate reducing means coupled to receive said multiplicity of digital data streams each having an associated bit rate for providing converted digital data streams at bit rates reduced from said associated bit rates;

means coupled to said bit rate reducing means for sequentially positioning said converted digital data streams to establish a sequence of digital data bits and for grouping said sequence of digital data bits to form a multiplicity of sequential digital data streams wherein all digital data

streams have an equal number of data bits and equal bit rates, thereby providing a sequence of equal length and equal bit rate digital data streams; and

means coupled to said sequentially positioning means for providing said sequence of digital data streams for transmission.

4,890,284

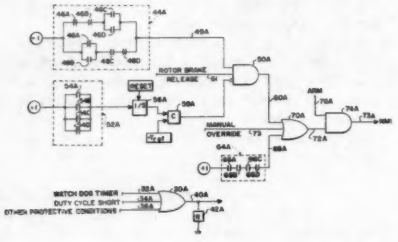
BACKUP CONTROL SYSTEM (BUCS)

Richard D. Murphy, Trumbull, and William C. Fischer, Monroe, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Feb. 22, 1988, Ser. No. 159,483

Int. Cl.[4] G06F *11/20*

U.S. Cl. 371—9.1 **10 Claims**



1. In a computer system (10) having a plurality of identical processors (12) and controlling a device (24), a method of providing control over the device comprising:

installing identical primary software in a portion (18) of memory (16) associated with each processor (12), said primary software directing the operation of the processors to control the device during normal operation;

installing backup software, dissimilar from the primary software, in an isolated portion (20) of memory (16) associated with at least one of the processors (12), said backup software capable of directing the operation of the processor(s) to control the device of in the event of a sensed event;

sensing for a fault event occurring in the primary software affecting all processors;

sensing for a fault event occurring in the primary software affecting a majority of the processors (12);

sensing for an externally initiated event represented by a backup software transfer command signal;

providing a nonmaskable interrupt request in response to one of said sensed events;

completing whatever instruction is being executed in the primary software when the nonmaskable interrupt request is provided, and then acknowledging the nonmaskable interrupt request; and

disabling the primary software and executing the backup software in response to the nonmaskable interrupt request so as to maintain control over the device with the backup software associated with the at least one processor.

4,890,285

CYCLE COUNTER FOR TIMEOUT MICRODIAGNOSTICS

Peter M. Dichiara, Arlington, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.

Filed Apr. 1, 1988, Ser. No. 176,784

Int. Cl.[4] G06F *11/04*

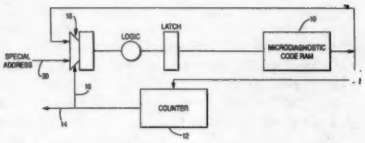
U.S. Cl. 371—16.2 **7 Claims**

1. A method for reducing a console's interaction time in performing microdiagnostic tests on a central processing unit, which comprise the steps of:

(a) maintaining a means to operate microdiagnostic code in the central processing unit, said microdiagnostic code performing tests on the central processing unit;

(b) loading a means for counting cycles with a value from said microdiagnostic code, said value exceeding the time necessary for performance of the test;

(c) initializing the means for counting cycles with the microdiagnostic code to begin counting at a cycle when a clock coupled to said central processing unit is deasserted in accordance with said microdiagnostic code;



(d) counting the number of cycles in said means for counting cycles and causing a machine check trap to occur when the number of cycles equals the previous loaded value, said trap allowing the microsequencer to gain control of the test regardless of any error conditions that are present; and

(e) performing any necessary diagnostic tests with a diagnostic microcode at the machine check trap location.

4,890,286

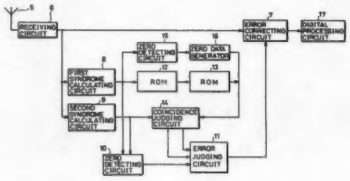
METHOD AND APPARATUS FOR DECODING ERROR CORRECTING CODE

Shintaro Hirose, Gifu, Japan, assignor to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Dec. 11, 1987, Ser. No. 131,922

Int. Cl.[4] G06F *11/10*

U.S. Cl. 371—37.1 **15 Claims**



1. An error correcting code decoding apparatus comprising:

means for receiving a digital signal train V(X) added with an error correcting code on the basis of a generator polynominal G(X) formed by a first primitive polynominal $G_1(X)$ and a second primitive polynominal $G_2(X)$;

first syndrome calculating means for dividing said received signal train V(X) by said first primitive polynominal $G_1(X)$ to obtain a syndrome $S_1(X)$, being the remainder term, said first primitive polynominal $G_1(X)$ being a polynominal of degree m (m: positive integer), said syndrome $S_1(X)$ being obtained by dividing said signal train V(X), including a single-bit error, by said first primitive polynominal $G_1(X)$ being in a cycle of 2^m-1;

second syndrome calculating means for dividing said received signal train V(X) by said second primitive polynominal $G_2(X)$ to obtain an actual syndrome $S_2(X)$, being the remainder term, said second primitive polynominal $G_2(X)$ being a polynominal of said degree m, said actual syndrome $S_2(X)$ being obtained by dividing said signal train V(X), including said single-bit error, by said second primitive polynominal $G_2(X)$ being in a cycle of $(2^m-1)/n$ (n: positive integer);

error position calculating means for obtaining a single-bit

error position l of said received signal train on the basis of said syndrome $S_1(X)$ obtained by said first syndrome calculating means;

means for obtaining an assumed syndrome $S_2'(X)$ corresponding to said single-bit error position l calculated by said error position calculating means among values of said actual syndrome $S_2(X)$ corresponding to single-bit errors;

means for comparing said actual syndrome $S_2(X)$ outputted from said second syndrome calculating means with said assumed syndrome $S_2'(X)$; and

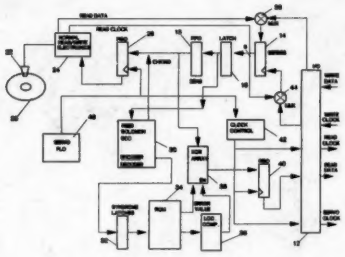
means for judging that said received signal train V(X) includes said single-bit error upon coincidence of said actual syndrome $S_2(X)$ with said assumed syndrome $S_2'(X)$ while judging that said received signal train V(X) includes a double-bit error or a multiple-bit error upon non-coincidence as the result of comparison by said comparing means.

4,890,287

ON-THE-FLY ERROR CORRECTION

Bruce E. Johnson, Minnetonka, and Paul Tsang, Plymouth, both of Minn., assignors to Magnetic Peripherals Inc., Minnetonka, Minn.

Filed Mar. 9, 1988, Ser. No. 166,085
Int. Cl.[4] G06F *11/12*
U.S. Cl. 371—37.2 **9 Claims**



1. On-the-fly error correction apparatus comprising:

means for reading an encoded codeword from a data storage device and simultaneously supplying said codeword, symbol by symbol, to a buffer and to a divider means for dividing the encoded codeword by its generator polynomial;

said divider means comprising at least two registers and a corresponding number of Galois field multipliers, and resultant in said registers after all symbols of the codeword have been divided comprising a remainder;

means responsive to said divider registers after all said codeword symbols have been divided for looking up an error location and value in a memory and for outputting the error value to a latch and the error location to a counter; and

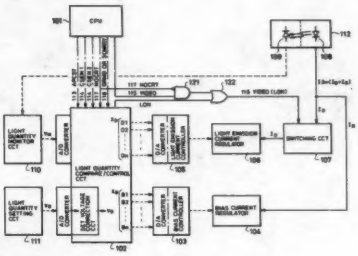
means responsive to said latch; said counter, and said buffer for correcting an incorrect symbol of said codeword using the error value in said latch as located by the error location contained in said counter.

4,890,288

LIGHT QUANTITY CONTROL DEVICE

Toshihiko Inuyama, Fujisawa; Junichi Kimizuka, Yokohama; Akihisa Kusano, Kawasaki; Kaoru Sato, Yokohama, and Takashi Soya, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 21, 1987, Ser. No. 87,707
Claims priority, application Japan, Aug. 27, 1986, 61-198988; Aug. 27, 1986, 61-198989; Aug. 27, 1986, 61-198990; Aug. 27, 1986, 61-198991
Int. Cl.[4] H01S *3/13*
U.S. Cl. 372—31 **16 Claims**



1. A light quantity control device comprising:

beam generating means;

monitor means for monitoring the quantity of light of a beam generated by said beam generating means; and

control means for controlling the light quantity of the beam generated by said beam generating means in response to the output of said monitor means, wherein said control means comprises digital value output means for outputting a digital value representing a quantity of light of the beam and a light quantity control circuit means for controlling the quantity of light in response to receiving the digital value, said digital value output means being constructed for varying the rate of change of the digital value in accordance with the output of said monitor means so as to cause the quantity of light to be constant.

4,890,289

FIBER COUPLED DIODE PUMPED MOVING SOLID STATE LASER

Santanu Basu, Palo Alto, and Robert L. Byer, Stanford, both of Calif., assignors to Board of Trustees of Leland Stanford, Jr. University, Stanford, Calif.

Filed Dec. 4, 1987, Ser. No. 128,581
Int. Cl.[4] H01S *3/093*
U.S. Cl. 372—33 **17 Claims**

1. In a method for generating an output beam of coherent lasant radiation, the steps of:

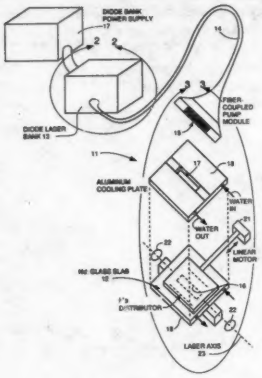
coupling the output of a plurality of individual diode sources which form optical pumping radiation, into a fiber optic waveguide structure;

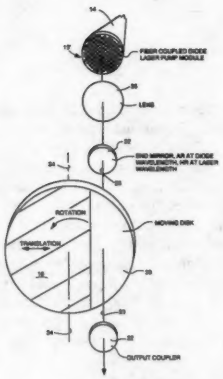
guiding and concentrating said output through the fiber optic waveguide structure to and thence into a selectively pumped region of a structure of laser gain material for illuminating and for optically pumping of the selected region of the laser gain material, said region being only a part of said structure;

stimulating emission of coherent lasant radiation from the illuminated and selectively optically pumped region of said laser gain material to produce an output beam of coherent lasant radiation; and

imparting cyclical relative motion to said structure relative to said region to cyclically move said selectively pumped region relative to the remainder of said gain material so as

to distribute the heat generated in said laser gain material by said optical pumping radiation throughout said lasant





material to inhibit thermally induced birefringence and gain non-uniformity effects on said output beam.

4,890,290

LASER LIGHT SOURCE WITH REDUCED SENSITIVITY TO OPTICAL FEEDBACK EFFECTS

Ralph T. Hawkins, II, 18455 SW. Lapaz Ct., Aloha, Oreg. 97007

Filed Jan. 9, 1989, Ser. No. 294,232
Int. Cl.[4] H01S *3/00*
U.S. Cl. 372—33 **9 Claims**

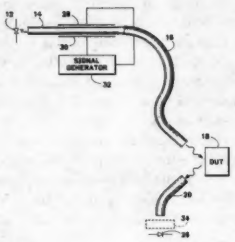
1. A laser light source with reduced sensitivity to optical feedback effects, comprising:

a laser device for emitting light,

a body of electro-optic material optically coupled to said laser device for receiving and propagating light emitted thereby,

electrode means for establishing an electric field in a region of the body of electro-optic material through which the light propagates, and

a voltage source for generating a voltage that changes linearly with time for a selected period of time, said voltage



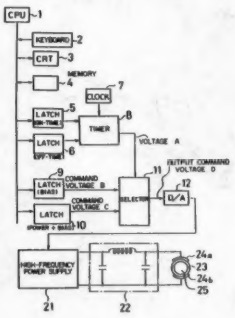
source being connected to the electrode means for applying said voltage to the electrode means.

4,890,291

LASER OSCILLATOR CONTROL CIRCUIT

Etsuo Yamazaki, Hachioji, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP88/00184, § 371 Date Nov. 3, 1988, § 102(e) Date Nov. 3, 1988, PCT Pub. No. WO88/07274, PCT Pub. Date Sep. 22, 1988
PCT Filed Feb. 19, 1988, Ser. No. 273,520
Claims priority, application Japan, Mar. 20, 1987, 62-066777
Int. Cl.[4] H01S *3/00*
U.S. Cl. 372—38 **6 Claims**



1. A laser oscillator control circuit for controlling a command voltage to control an output power of a laser that is dependent upon an electric discharge and at least an output voltage, comprising:

time setting means for setting an on-time and off-time;

pulse generating means having a timer for generating a pulse train in accordance with said on-time and said off-time;

bias command voltage setting means for setting data defining a bias command voltage representing a lowest level at which the electric discharge can be started;

output voltage setting means for setting data defining an output power voltage which is the sum of output voltage to produce the output power and said bias command voltage; and

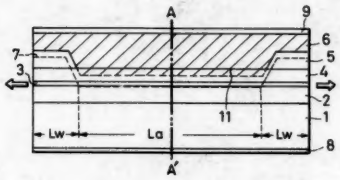
selector means for selecting and outputting the output power voltage when said pulse train is on and for selecting and outputting said bias command voltage when said pulse train is off.

4,890,292

SEMICONDUCTOR LASER DEVICE

Hisao Kumabe, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 222,375, Jul. 19, 1988, abandoned, which is a continuation of Ser. No. 89,085, Aug. 25, 1987, abandoned. This application Apr. 13, 1989, Ser. No. 338,341
Claims priority, application Japan, Sep. 2, 1986, 61-207339
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—415 2 Claims



1. A semiconductor laser device of the type having first and second resonator mirrors defining a resonator cavity therebetween, said mirrors together defining a resonator direction, said device comprising:

a first-conductivity type semiconductor crystal substrate disposed in said cavity having a U-shaped stripe groove formed in the semiconductor crystal substrate in said resonator direction thereon;

a first-conductivity type lower cladding layer formed on said grooved substrate, said lower cladding layer being bent along said U-shaped stripe groove;

a first conductivity type active layer formed on said lower cladding layer, said active layer formed on said lower cladding layer, said active layer being bent along said U-shaped stripe groove, the refractive index of said active layer being larger than that of said cladding layer, and the forbidden band width of a center portion, except in the neighborhood of the resonator mirrors, of said active layer being smaller than that of said lower cladding layer;

a second-conductivity type upper cladding layer formed on said bent active layer, said upper cladding layer being bent along and exposed to said U-shaped stripe groove, the refractive index of said upper cladding layer being smaller than that of said active layer, and the forbidden band width of said upper cladding layer being larger than that of at least the center portion of said active layer;

a first-conductivity type current blocking layer formed on aid bent upper cladding layer, said current blocking layer having a rectangular groove at the center portion thereof except adjacent the resonator mirrors so that a parts of said upper cladding layer is exposed at a bottom of said rectangular groove;

a second-conductivity type contact layer formed on said current blocking layer and said upper cladding layer exposed at the bottom of said rectangular groove, said upper cladding layer, active layer and lower cladding layer defining a guide structure having a difference in refractive index in the transverse direction; and

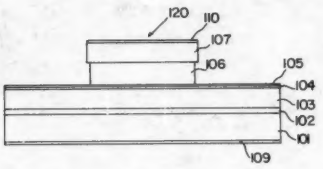
a pair of n-side and p-side electrodes provided adjacent said substrate and said contact layer, respectively.

4,890,293

SEMICONDUCTOR LASER DEVICE

Mototaka Taneya, Tsukuba; Kosei Takahashi, Nara; Toshiro Hayakawa, Yokohama; Sadayoshi Matsui, Tenri; Mitsuhiro Matsumoto, Nara, and Hiroyuki Hosoba, Tenri, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 7, 1988, Ser. No. 255,049
Claims priority, application Japan, Oct. 8, 1987, 62-254918
Int. Cl.[4] H01S 3/19
U.S. Cl. 372—46 2 Claims



1. In a semiconductor laser device with an active layer for laser oscillation, the combination of a first layer that is of a first conductivity type; a second layer that is disposed as said active layer on said first layer, said second layer having a forbidden bandgap smaller than that of said first layer and having a refraction index larger than that of said first layer; a third layer that is of a second conductivity type, said third layer being disposed over said second layer, having a forbidden bandgap larger than that of said second layer, and having a refraction index smaller than that of said second layer; a fourth layer that functions as a quantum well, said fourth layer being disposed between said second and third layers and the thickness of said fourth layer being the de Broglie's wavelength or less; and at least one striped mesa, the lower portion of which is constituted by said third layer, wherein said fourth layer has a forbidden bandgap that is larger than that of the energy of photons generated by said second layer, and moreover said fourth layer is formed from a material with an etching rate different from that of a material from which said third layer positioned just above said fourth layer is formed.

4,890,294

PLASMA APPARATUS

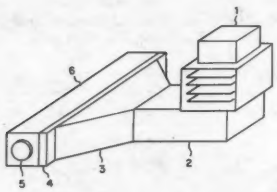
Junichi Nishimae; Kenji Yoshizawa; Masakazu Taki; Yoshihiro Ueda; Tadashi Yanagi, and Akihiko Iwata, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 25, 1988, Ser. No. 147,726
Claims priority, application Japan, Jan. 26, 1987, 62-15690; Jan. 28, 1987, 62-18071; Aug. 6, 1987, 62-195185; Sep. 10, 1987, 62-225202; Sep. 10, 1987, 62-225205; Sep. 10, 1987, 62-225206; Sep. 10, 1987, 225208; Sep. 10, 1987, 225209; Sep. 10, 1987, 62-225211; Sep. 10, 1987, 62-225214; Sep. 10, 1987, 62-225215; Sep. 10, 1987, 62-225219; Sep. 10, 1987, 62-225220; Sep. 10, 1987, 62-225221; Sep. 10, 1987, 62-225222; Sep. 10, 1987, 62-225222
Int. Cl.[4] H01S 3/22
U.S. Cl. 372—57 49 Claims

1. A gas laser comprising a laser resonant cavity having a plasma discharge space formed therein and including a laser optical axis extending therein, a source of microwave energy including a microwave oscillator, and a microwave transmission path connecting said source of microwave energy to said plasma discharge space for providing microwave excitation to a plasma generating medium in said plasma discharge space,

said plasma discharge space comprising a conductor wall forming a part of the plasma discharge space and a dielectric positioned opposite to the conductor wall to form together with said conductor wall and within said plasma

discharge space a microwave excitation mode having an electric field component orthogonal to the boundary



between the dielectric and the plasma excited in said plasma discharge space by the microwave energy.

4,890,295

LASER APPARATUS

Graeme L. Clark, Chelmsford, United Kingdom, and Arthur Maitland, Fife, Scotland, assignors to English Electric Valve Company Limited, Chelmsford, United Kingdom

Filed May 11, 1988, Ser. No. 192,650

Claims priority, application United Kingdom, May 12, 1987, 8711212

Int. Cl.[4] H01S *3/03*

U.S. Cl. 372—61 **20 Claims**

1. In a gas discharge laser apparatus comprising an envelope and a plurality of laser discharge tubes contained within said envelope, the improvement comprising means, including a common anode for said plurality of tubes disposed at one end of said tubes and a common cathode for said plurality of tubes disposed at the opposite end of said tubes, for producing a gas discharge; and wherein each of said plurality of discharge tubes is formed of metal; and an electrically insulating material coats the outer surfaces of said plurality of tubes. such that output power of each tube when combined with output power of other tubes produces a high output power

---

4,890,296

HOUSING FOR THE OUTPUT COUPLER OF A LASER

Robert A. Crosby, Naperville, Ill., assignor to Amoco Corporation, Chicago, Ill.

Filed Jan. 19, 1989, Ser. No. 300,087

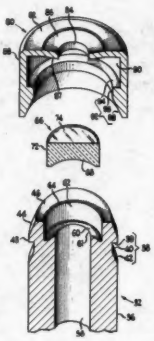
Int. Cl.[4] H01S *3/08*

U.S. Cl. 372—107 **15 Claims**

1. A housing for the output coupler of a laser, comprising:

a. an elongated body having a longitudinally extending bore, said body including an outer surface including anchoring means for securely connecting a cap thereto and said bore including an inner surface including means for aligning said output coupler with said bore of said body; and

b. said cap including an end having an aperture and a side-wall including snap fitting interconnecting means for interconnecting said cap to said anchoring means of said body, said output coupler being securely held between said alignment means of said inner surface of said body



and said end of said cap, wherein said output coupler is in axial alignment with said bore of said body.

4,890,297

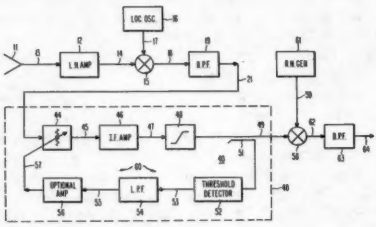
BURST JAMMER ERASURE CIRCUIT FOR SPREAD SPECTRUM RECEIVERS

John W. Zscheile, Jr., Farmington; Alan E. Lundquist, Salt Lake City, and Billie M. Spencer, Bountiful, all of Utah, assignors to Unisys Corp., Blue Bell, Pa.

Filed Oct. 19, 1988, Ser. No. 259,660

Int. Cl.[4] H04K *1/00*; H04L *9/00*

U.S. Cl. 375—1 **10 Claims**



1. A burst erasing automatic gain control (AGC) circuit for a spread spectrum receiver comprising:

variable attenuation means adapted to receive wideband spread spectrum signals subject to burst jamming signals,

amplifier means coupled to the output of said attenuation means,

limiting means coupled to the output of said amplifier means for limiting the AGC ed output signal to a level slightly above the desired AGC output level,

a loop control circuit coupled to said AGC ouput signal for setting the desired (AGC) output signal level,

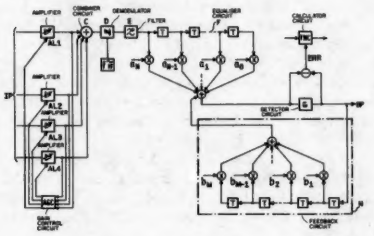
said output of said loop control circuit being coupled to said variable attenuation means for controlling said desired AGC output signal level, and

despreading means coupled to the output of said limiting means for erasing substantially all of said burst jamming signals without destabilizing said automatic gain control circuit.

4,890,298
TROPOSCATTER MODEM RECEIVER

Robert K. P. Galpin, Buckinghamshire, England, assignor to Plessey Overseas Limited, Ilford, England

Filed Dec. 8, 1987, Ser. No. 130,270
Claims priority, application United Kingdom, Dec. 11, 1986, 8629636
Int. Cl.[4] H04B 7/08
U.S. Cl. 375—14 4 Claims

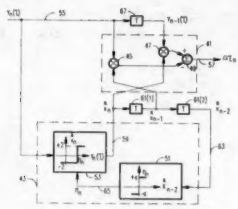


1. A Troposcatter modem receiver, for use in digital transmission systems, the modem receiver including a combiner means, a demodulator circuit, a baseband filter, a complex-coefficient forward equalizer circuit, a detector circuit and a feedback circuit, said combiner means includes a linear mixi-mal-ratio combiner and receives a plurality of input signals at an intermediate frequency and generates a combined output signal and presents the output signal to the demodulator circuit which produces a denidykated signal to the baseband filter which is filtered prior to being presented to the first input of the equalizer circuit to produce an output, the output of the equalizer circuit being forwarded as an input to the detector circuit which produces an output signal, which is fed back by way of the feedback circuit to a second input of the equalizer circuit to a second input of the equalizer circuit to modify the output signal of the detector circuit.

4,890,299
FAST TIMING ACQUISITION FOR PARTIAL-RESPONSE SIGNALLING

Francois B. Dolivo, Wadenswil, and Gottfried Ungerboeck, Langnau a.A, both of Switzerland, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 25, 1988, Ser. No. 237,601
Claims priority, application Switzerland, Nov. 13, 1987, 871167/83
Int. Cl.[4] H04L 25/34
U.S. Cl. 375—18 16 Claims



1. In a receiver for data having been sent or recorded as partial-response (PR) signals, wherein i and j are positive integer time indices and n is an integer time index that may be positive or negative,

apparatus for generating a timing gradient value $\Delta\tau_n$ for initially acquiring the sampling phase when a signal resulting from the transmission of a known preamble of the form $+1+1-1-1+1+1\ldots$ is received, said apparatus comprising:

a common input (55) for received signal samples y_n of a transmitted or recorded PR signal;

first delay means (67) having at least one delay stage, for accepting the present received signal sample y_n and for providing at least one previous received signal sample y_{n-j};

second delay means (61) having at least two delay stages, for accepting a present reconstructed data sample x_n and for providing at least a first previous reconstructed data sample

x_{n-j};

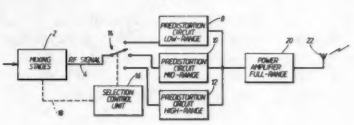
reconstruction means (43) connected to said common input and to said second delay means for generating said present reconstructed data sample x_n in response to said present received signal sample y_n and at least said first previous reconstructed data sample x_{n-j}; and

timing gradient generation means (41) connected to said common input and to said first and second delay means and being responsive to said present received signal sample and to output values of said two delay means, for generating said timing gradient value $\Delta\tau_n$.

4,890,300
RADIO TRANSMITTERS

Christopher J. Andrews, Berkshire, England, assignor to Racal Communications Equipment Limited, Berkshire, England

Filed Apr. 25, 1988, Ser. No. 185,788
Claims priority, application United Kingdom, Apr. 28, 1987, 8709998
Int. Cl.[4] H04L 25/49
U.S. Cl. 375—60 5 Claims



1. A radio transmitter including

a transmitter input for receiving a signal at a variable radio frequency for transmission,

a linear power amplifier for amplifying said signal and having an input and an output,

a plurality of pre-distortion circuits each having an input and an output, said outputs of said pre-distortion circuits being connectable to said amplifier input and said inputs of said pre-distortion circuit each being connectable to said transmitter input, and

means connecting said transmitter input via only one of said pre-distortion circuits to said amplifier input for selectively applying said signal to a said pre-distortion circuit selected in dependence on said frequency of said signal,

each pre-distortion circuit being adapted to produce a distortion for a specific fequency range which is substantially equal and opposite to the distortion produced by the amplifier for that frequency range so that signals within each of the ranges are substantially undistorted at the output of the amplifier.

4,890,301

ARRANGEMENT FOR COMPENSATING ERRORS IN A QUADRATURE MODULATOR

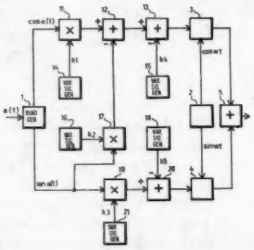
Bo G. Hedberg, Vällingby, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Nov. 14, 1988, Ser. No. 270,259

Claims priority, application Sweden, Nov. 27, 1987, 8704741

Int. Cl.[4] H03C *1/02*

U.S. Cl. 375—60 **2 Claims**



1. An arrangement for compensating errors occurrent in a quadrature modulator which includes means (1) for generating two quadrature signals in the baseband, cos a(t) and sin a(t), to a first and a second branch respectively in the modulator; means (2) for generating two high frequency signals (cos wt, sin wt) with a mutual phase difference of 90 degrees; mixers (3,4) for mixing the quadrature signals, with the high frequency signals (cos wt, sin wt) and an adder (5) for producing the sum of the output signals of said mixers (3,4), characterized in that the arrangement further includes adjustable signal generating means (14, 16, 21) for generating a first (k1), a second (k2) and a third (k3) signal; a means (11) incorporated in said first branch of the modulator for forming a fourth signal which constitutes the product of the cos a(t) quadrature signal and said first signal (k1); a means (17) for forming a fifth signal which constitutes the product of the sin a(t) quadrature signal and said second signal (k2); a means (12) incorporated in said first branch for forming a sixth signal which constitutes the difference between said fourth signal and said fifth signal; and a means (19) incorporated in said second branch of the modulator for forming a seventh signal which constitutes the product of the sin a(t) quadrature signal and said third signal (k3), whereby amplitude error and phase error are compensated by suitably adjusted values of said first to third signals (k1–k3).

4,890,302

CIRCUIT FOR EXTRACTING CARRIER SIGNALS

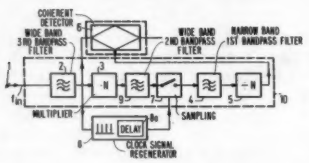
Dirk Muilwijk, Huizen, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Filed Dec. 8, 1987, Ser. No. 130,361

Claims priority, application Netherlands, Dec. 8, 1986, 8603110

Int. Cl.[4] H03D *3/06*

U.S. Cl. 375—80 **8 Claims**



6. A carrier reproducing circuit for extracting the carrier signal from a pulse-coded continuous phase-modulated carrier signal having a rational modulation index, comprising

a clock pulse regenerator; a multiplier, receiving said phase-modulated carrier signal, having a multiplication factor N(N=2, 3, . . .) for generating an N^{th} harmonic of said phase-modulated carrier signal, and producing a multiplier output comprising said N^{th} harmonic, where N is an integer greater than 1; a first bandpass filter coupled to the multiplier and receiving said output for isolating said N^{th} harmonic, and having a first filter output which is the isolated N^{th} harmonic; and a divider connected to the first bandpass filter for receiving the isolated N^{th} harmonic, having a dividend N and a divider output which is said extracted carrier signal,

characterized by comprising a sampling circuit inserted between the multiplier and the first bandpass filter, connected to the clock pulse regenerator for instantaneous sampling of the N^{th} harmonic under the control of a clock pulse signal originating from the clock pulse regenerator at no less than one predetermined sampling point per symbol time T of the data signal, and for conveying these instantaneously sampled signal values to the first bandpass filter only.

4,890,303

METHOD AND CIRCUIT FOR SYNCHRONIZING A DIGITAL DATA TRANSMISSION SYSTEM WITH A NETWORK-EXTERNAL CLOCK

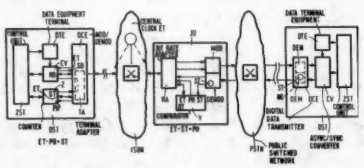
Edgar Bader, Rückersdorf, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 715,231, Mar. 22, 1985, abandoned. This application Mar. 30, 1988, Ser. No. 175,639

Claims priority, application Fed. Rep. of Germany, Mar. 20, 1984, 3410188

Int. Cl.[4] H04L *7/00*

U.S. Cl. 375—107 **6 Claims**



1. In a data transmission system comprising a first digital data station communicating through an integrated services digital network, interworking unit, and public switched analog network to a second data station, a method for synchronizing local clocks at each of said data stations comprising:

comparing in said interworking unit the phase of said second station local clock with a central clock associated with said integrated services digital network;

transmitting the result of said phase comparing over a signalling path to said first digital data station; and,

regenerating the local clock signal in said first digital data station in accordance with said result and said central clock frequency.

4,890,304

RELIABLE RECOVERY OF DATA IN ENCODER/DECODER

Kadiresan Annamalai, Milpitas, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Nov. 7, 1988, Ser. No. 268,396

Int. Cl.[4] H04L *7/00*

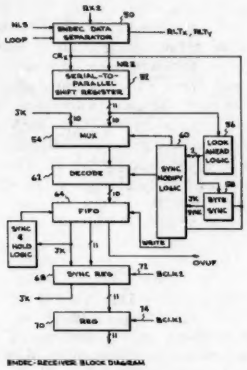
U.S. Cl. 375—114 **5 Claims**

1. A method of adjusting a synchronizing signal aligned with a start-of-packet delimiter for serially-received digital signals

from a network; said serially-received digital signals having a predetermined inter-bit period, comprising the steps:

(a) converting said serially-received digital signals into plural-bit parallel words;

(b) detecting occurrence of said delimiter during the nth inter-bit period following the most-recent occurrence of said synchronizing signal; and



(c) generating said adjusted synchronizing signal at the time of detection of step (b) if $n>2$;

delayed by one said inter-bit period from the time of detection of step (b) if $n=2$; or

delayed by two said inter-bit periods from the time of detection of step (b) if $n=1$.

4,890,305

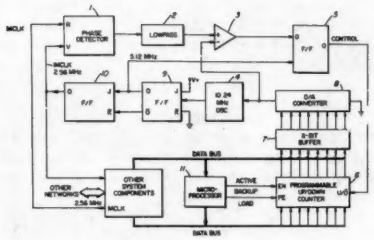
DUAL-TRACKING PHASE-LOCKED LOOP

Paul A. Devries, Wayne, Mich., assignor to Northern Telecom Limited, Montreal, Canada

Filed Feb. 12, 1988, Ser. No. 155,575

Int. Cl.[4] H03D *3/24*

U.S. Cl. 375—120 **6 Claims**



1. A dual-tracking phase-locked loop (DTPLL), comprising: phase detection means responsive to the phases of active and back-up clock signals; comparator means responsive to said phase detection means and to programmable counter means counting up or down in response to said comparator means; oscillator means responsive to said programmable counter means for providing said back-up clock signal; and said programmable counter means comprising a microprocessor for latching a digital value in an up/down counter in response to change in a master clock recovered from an incoming data stream, and a digital-to-analog (D/A) convertor for converting the latched value to an analog value for controlling the frequency of said oscillator means so that when the microprocessor senses said changes in said master clock and latches said digital value, it inhibits the up/down counter from counting and causes said phase detection means and said comparator means to cease to affect said oscillator means.

4,890,306

TOOL HOLDER FOR MONITORING TOOL SERVICE TIME

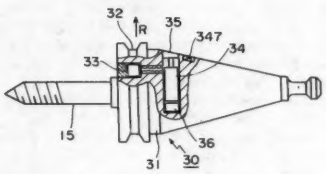
Shigeo Noda, Nagoya, Japan, assignor to Toyoda Machine Works, Ltd., Kariya, Japan

Filed Mar. 14, 1988, Ser. No. 167,918

Claims priority, application Japan, Mar. 30, 1987, 62-77159

Int. Cl.[4] B23Q *3/15;* B23B *49/00;* G06M *3/06*

U.S. Cl. 377—15 **4 Claims**



1. A tool holder holding a tool and replaceably attached to a main spindle of a machine tool, said tool holder comprising:

a body holding said tool;

sensor means provided in said body for detecting whether or not said tool is used in a machining operation;

counter means provided in said body for counting time cumulatively during the time when the output signal from said sensor means indicates that said tool is used, and for storing said cumulatively counted time as service time;

output means provided in said body for outputting said service time held in said counter means to an outside circuit; and

reset switch means provided on said body for resetting said counter means, whereby said counter means may be reset when said tool is reground or replaced.

4,890,307

INPUT CIRCUIT OF CHARGE TRANSFER DEVICE

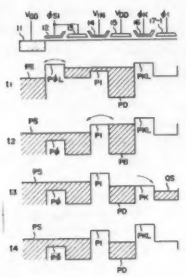
Shin-ichi Imai, and Naoki Hosoya, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 19, 1988, Ser. No. 195,870

Claims priority, application Japan, May 21, 1987, 62-124619

Int. Cl.[4] G11C *19/28;* H01L *29/78*

U.S. Cl. 377—60 **11 Claims**



1. A charge transfer device comprising:

a semiconductor substrate of a first conductivity type;

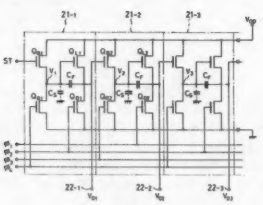
a source region formed in the main surface area of said semiconductor substrate;
an insulation film formed on said semiconductor substrate;
a signal input electrode formed on said insulating film;
a source barrier electrode arranged between said source region and said signal input electrode on said insulation film and formed to isolate said source region from said signal input electrode;
a source charge storing electrode arranged adjacent to said source barrier electrode, between said source region and said signal input electrode on said insulation film;
an input charge storing electrode formed adjacent to said signal input electrode on said insulation film;
a charge injection electrode formed adjacent to said input charge storing electrode on said insulation film;
a plurality of charge transfer electrodes formed adjacent to said charge injection electrode on said insulation film;
source voltage generating means for generating a D.C. source voltage applied to said source region;
first pulse signal generating means for supplying a first pulse signal to said source barrier electrode and said source charge storing electrode;
input signal supplying means for supplying an input signal to said signal input electrode;
D.C. voltage applying means for applying a preset D.C. voltage to said input charge storing electrode;
second pulse signal generating means for supplying a second pulse signal to said charge injection electrode; and
transfer pulse signal generating means for supplying transfer pulse signals to said charge transfer electrodes.

4,890,308

SCANNING PULSE GENERATING CIRCUIT

Masaharu Imai, Ina, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Sep. 6, 1988, Ser. No. 240,667
Claims priority, application Japan, Sep. 19, 1987, 62-233733; Sep. 19, 1987, 62-233734
Int. Cl.[4] H03K *5/15*; G11C *19/18*
U.S. Cl. 377—79 **10 Claims**



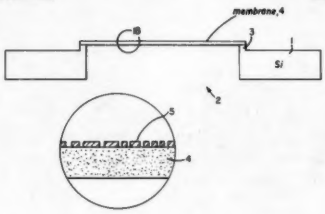
1. A scanning pulse generating circuit comprising:
(a) a plurality of first basic circuits each including:
a first MOS transistor with the gate terminal thereof serving as an input terminal;
a second MOS transistor connected in series to said first MOS transistor with one of main electrodes thereof being grounded while the gate terminal thereof being capable of receiving a first synchronizing pulse;
a third MOS transistor having the gate terminal therof connected to the point of juncture between said first and second MOS transistors while one of the main electrodes thereof being connected to a power supply;
a fourth MOS transistor connected in series to said third MOS transistor with one of the main electrodes thereof being grounded while the gate electrode thereof being capable of receiving a second synchronizing pulse; and
a first capacitive element connected between the point of juncture between said first and second MOS transistors and the point of juncture between said third and fourth MOS transistors, the point of juncture between said third and fourth MOS transistors constituting an output terminal; and
(b) a plurality of second basic circuits each including:
fifth, sixth, seventh and eighth MOS transistors corresponding to said first, second, third and fourth MOS transistors of said first basic circuit, respectively; and
a second capacitive element corresponding to said first capacitive element;
said fifth, sixth, seventh and eighth MOS transistors and said second capacitive element being connected in the same manner as the corresponding elements in said first basic circuit, said output terminal of said first basic circuit being connected to the gate terminal of said fifth MOS transistor, the gate terminals of said sixth and eighth MOS transistors being capable of receiving third and fourth synchronizing pulses, respectively;
said first and second basic circuits being connected alternately in a multiplicity of stages so that scanning pulses are derived from the output terminals of said basic circuits of the successive stages.

4,890,309

LITHOGRAPHY MASK WITH A π-PHASE SHIFTING ATTENUATOR

Henry I. Smith, Sudbury; Erik H. Anderson, Cambridge, and Mark L. Schattenburg, Brookline, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Feb. 25, 1987, Ser. No. 18,587
Int. Cl.[4] B05D *3/06*; G03F *9/00*
U.S. Cl. 378—35 **18 Claims**



14. X-ray lithography mask including open features and an attenuator whose material and thickness are selected to both pass a fraction of the incident x-rays and to phase shift the x-rays relative to those passing through open features of the mask by approximately an odd multiple of π radians in order to reduce deleterious diffraction effects.

4,890,310

SPECTRAL TYPE RADIATION IMAGING SYSTEM

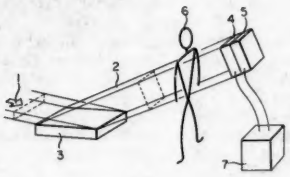
Keiji Umetani, Fuchu; Ken Ueda, Ome; Ryuichi Suzuki, Kokubunji, and Hisatake Yokouchi, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 9, 1987, Ser. No. 106,345
Claims priority, application Japan, Oct. 9, 1986, 61-239008
Int. Cl.[4] G01T *1/36*
U.S. Cl. 378—82 **14 Claims**

1. A spectral type radiation imaging system in which x-ray imaging is performed using a contrast agent, comprising:
an x-ray source for emitting a quasi-monochromatic x-ray beam to be projected to an object, the energy bandwidth of which extends between, above and below the absorption edge energy of an element constituting the contrast agent, wherein said x-ray source comprises as asymmetrically cut crystal for asymmetrically reflecting an incident x-ray beam to provide the quasi-monochromatic x-ray beam;
a first x-ray detector for detecting x-rays penetrating through the object, said first x-ray detector comprising a

scintillator made of fluorscent material containing the contrast-agent constituting element; and

a second x-ray detector, at a location behind the first x-ray



detector so that the first x-ray detector is interposed between the x-ray source and second x-ray detector, for detecting x-rays penetrating through said first x-ray detector.

4,890,311

BIOPSY MEANS FOR AN X-RAY EXAMINATION APPARATUS

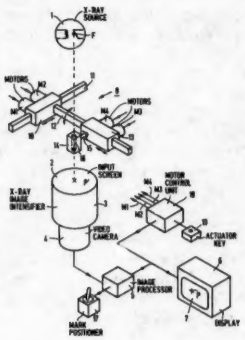
Edmund Saffer, Eggolsheim, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 17, 1988, Ser. No. 208,246

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1987, 3721589

Int. Cl.[4] H05G *1/64, 5/30*

U.S. Cl. 378—99 **10 Claims**



1. In an x-ray diagnostics installation having an x-ray source with a focus from which an x-ray beam emanates, and an x-radiation receiver disposed for receiving x-radiation attenuated by a diagnostically relevant region in a patient between said x-ray source and said x-radiation receiver, the improvement of a guiding and positioning assembly for a biopsy needle comprising:

means for determining a paracentesis point on said patient for said biopsy needle lying on a straight line between said focus and said diagnostically relevant region;

a guide element for said biopsy needle having a channel therein for holding said biopsy needle in said channel, said channel having a longitudinal axis; and

means for automatically positioning said guide element so that said longitudinal axis of said channel always proceeds through said focus.

4,890,312

PIEZOELECTRIC ATTENUATION TONGUE SYSTEM FOR SLIT RADIOGRAPHY EQUIPMENT

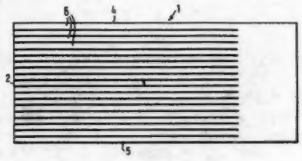
Simon Duinker, Bloemendaal, Netherlands, assignor to B. V. Optische Industrie "De Oude Delft" , Delft, Netherlands

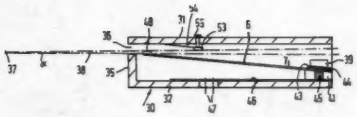
Filed Nov. 14, 1986, Ser. No. 931,540

Claims priority, application Netherlands, Nov. 15, 1985, 8503151

Int. Cl.[4] G21K *1/00*

U.S. Cl. 378—146 **17 Claims**





1. A piezoelectric attenuation assembly for slit radiography, which comprises:

a carrier assembly having openings defining a passageway for a planar X-ray beam of a predetermined width and height;

a piezoelectric plate member positioned within and mounted at a base portion thereof to said carrier assembly and having a free end portion extending towards said passageway, said piezoelectric plate member formed of a single plate of piezoelectric material with a plurality of elongated attenuation elements beginning at and extending from said base portion to said free end portion.

4,890,313

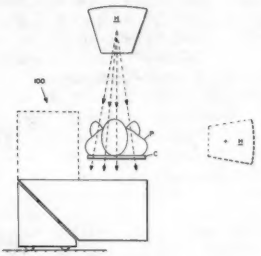
BI-DIRECTIONAL X-RAY IMAGER

Veronica Y. Lam, and Wing-Chee Lam, both of Baltimore, Md., assignors to Johns Hopkins University, Baltimore, Md.

Filed Dec. 3, 1987, Ser. No. 128,224

Int. Cl.[4] H01J *31/50*

U.S. Cl. 378—189 **8 Claims**



1. A system for use with x-rays including a fluorescence screen excitable to emit light by projection of said x-rays thereon, said protection of x-rays being selectively perpendicu-

lar to a first plane and to a second plane perpendicular to the first plane, the improvement comprising:

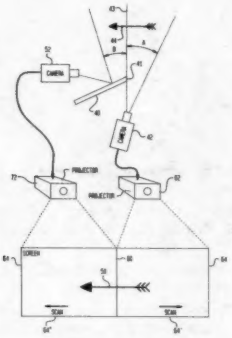
orienting means for orienting said fluorescence screen selectively in said first plane and in said second plane for receiving x-rays, said orienting means including first and second boxes, each of said boxes having a forty-five degree joint structure, said joint structures being connected to each other and relatively rotatable through an angle of one hundred and eighty degrees, such that relative rotation of said joint structures through an angle of one hundred and eighty degrees orients said fluorescence screen selectively in the first plane and the second plane.

4,890,314

TELECONFERENCE FACILITY WITH HIGH RESOLUTION VIDEO DISPLAY

Thomas H. Judd, Madison, and Lanny S. Smoot, Morristown, both of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.

Filed Aug. 26, 1988, Ser. No. 237,501
Int. Cl.[4] H04N *7/14*
U.S. Cl. 379—53 **14 Claims**



3. An arrangement for forming a single high resolution video image comprising:

first and second video image sensing devices having distinct spatial locations, said first and second video image sensing devices being adapted to scan first and second fields of view, respectively, and being adapted to form first and second sub-images, respectively, said first and second image sensing devices being positioned so that said first and second fields of view overlap, and

means for cropping the scanning of said first and second image sensing devices so that said first and second sub-images do not overlap and merge continuously to form said single high resolution image.

4. A station for use in a teleconferencing system comprising

display means for displaying a first high resolution video image formed from a plurality of adjoining first sub-images transmitted to said station,

image sensing means for producing at a remote location a second high resolution video image comprising a plurality of second sub-images, said image sensing means comprising a plurality of individual image sensing devices, each of which produces one of said second sub-images, and

means for transmitting audio signals to said remote location,

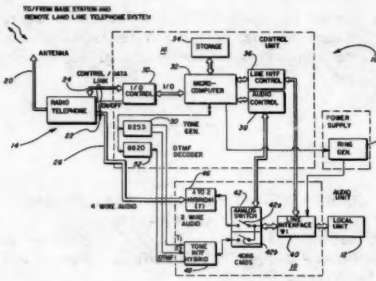
wherein said image sensing means comprises first and second image sensing devices for scanning first and second fields of view respectively, and mirror means for insuring that said fields of view are contiguous over a range of distances from said image sensing devices so that the sub-images produced by said first and second image sensing divides merge continuously into said second high resolution image.

4,890,315

CELLULAR REMOTE STATION WITH MULTIPLE COUPLED UNITS

Arne B. Hendixen; William A. Bowen; Michael W. Evans, all of Lynchburg, Va.; John J. Hurley, Hudson, Ohio, and Samuel A. Leslie, Forest, Va., assignors to Orion Industries, Inc., Solon, Ohio

Continuation of Ser. No. 28,249, Mar. 20, 1987, abandoned. This application Dec. 29, 1988, Ser. No. 291,343
Int. Cl.[4] H04G *7/04*
U.S. Cl. 379—59 **23 Claims**



1. A remote station for use in a cellular radio telephone system connectable to one or more units local to that station, the station comprising:

a cellular transceiver including means for detecting and responding to two or more predetermined, different identification numbers received at the transceiver from the radio telephone system;

programmable means, coupled to said transceiver for receiving an indicia of a detected, predetermined identification number therefrom and for storing each said indicia; and

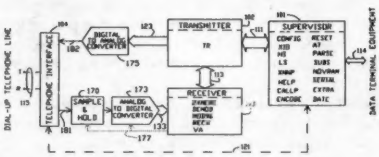
means for signaling at least a selected one of the connected local units corresponding to said stored indicia and for providing a bidirectional audio communication path between said transceiver and the corresponding local unit.

4,890,316

MODEM FOR COMMUNICATING AT HIGH SPEED OVER VOICE-GRADE TELEPHONE CIRCUITS

Dale M. Walsh, 7981 Creekwood Drive, Burr Ridge, Ill. 60525, and Clifford H. Wallach, 53 Berwick Ct., Lincolnshire, Ill. 60015

Filed Oct. 28, 1988, Ser. No. 264,792
Int. Cl.[4] H04M *11/00*
U.S. Cl. 379—98 **6 Claims**



1. A modem for connecting digital data terminal equipment to an analog communication link comprising, in combination, frequency division filtering means serially connected with said link for establishing a high speed channel having a

bandwidth in a first range of frequencies and a low speed channel having a bandwidth in a second and more limited range of frequencies,

digital-to-analog conversion means connected between said equipment and said filtering means for translating digital signals from said equipment into analog signals for transmission over said link in a selected one of said high or low speed channels,

analog-to-digital conversion means connected between said equipment and said filtering means for producing digital signals supplied to said equipment from the analog signals received over the other one of said channels, and

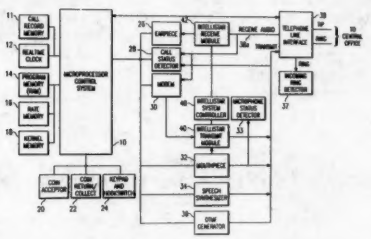
means operative when said digital-to-analog conversion means is transmitting data over said low speed channel for sending a rate change request signal over low speed channel to request a change in the rate of data transmission over said high speed channel.

4,890,317

AUTOMATIC VALIDATION OF TELEPHONE ACCOUNT NUMBERS

John A. Hird, Dallas; Lindsey D. Owen, and Michael R. Rice, both of Carrollton, all of Tex., assignors to Intellicall, Inc., Carrollton, Tex.

Filed Jan. 23, 1989, Ser. No. 301,347
Int. Cl.[4] H04M *3/42, 15/30, 11/02*
U.S. Cl. 379—132 **31 Claims**



1. Apparatus for determining the validity of a billing account number entered by a user of a localized telecommunications device operating in conjunction with a telecommunications network comprising:

circuitry at the device for making an attempt to complete a predetermined telephonic connection using the billing account number;

sensing circuitry at the device to determine if said attempt to complete said predetermined telephonic connection was made by the telecommunications network in order to indicate the validity of the billing account number.

4,890,318

BUILDING ENTRANCE TERMINAL

Robert A. Crane, Windham, and Harrod W. Morse, Portland, both of Me., assignors to GTE Products Corporation, Stamford, Conn.

Filed Oct. 19, 1987, Ser. No. 109,568
Int. Cl.[4] H04M *9/00*
U.S. Cl. 379—399 **11 Claims**

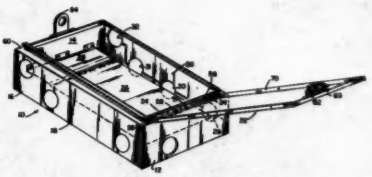
1. A terminal enclosure for telephone components or the like comprising:

a pair of spaced side walls, a top wall, a rear wall and a bottom wall;

a mounting panel disposed in spaced relation with said rear wall, and substantially parallel thereto,

a pair of support members for receiving said panel, one of said support members having mounted thereon at least one pair of receptacles for receiving a pair of fastening elements and the other of said support members having mounted thereon a hinge with a flange having a pair of threaded fasteners disposed therein with heads extending toward said panel; and

said panel having a pair of fasteners connected to one side thereof for mating engagement with said fastener receptacles and the opposite side of said panel having a pair of keyhole shaped slots formed therein, a larger opening of



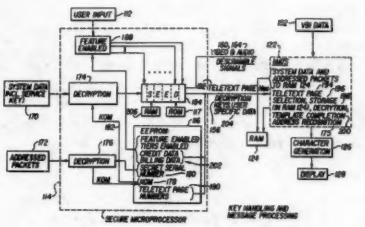
each said slot being dimensioned larger than said threaded fastener heads and a smaller opening of each said slot dimensioned less than said threaded fastener heads whereby said panel is readily attachable to said supports by sliding said smaller openings of said key-hole slots under said threaded fastener heads and releasable by passing the larger openings over said fastener heads to release said panel.

4,890,319

METHOD FOR CONTROLLING COPYING OF PROTECTED INFORMATION TRANSMITTED OVER A COMMUNICATIONS LINK

Nigel Seth-Smith; Cameron Bates; Samson Lim; William van Rassel; Robert Yoneda, all of, Toronto, and Keith Lucas, Richmond Hill, all of Canada, assignors to Scientific-Atlantic, Inc., Atlanta, Ga.

Continuation of Ser. No. 883,301, Jul. 8, 1986, Pat. No. 4,829,569, which is a continuation-in-part of Ser. No. 653,061, Sep. 21, 1984. This application Sep. 8, 1988, Ser. No. 241,939
Int. Cl.[4] H04N *7/167*
U.S. Cl. 380—5 **3 Claims**



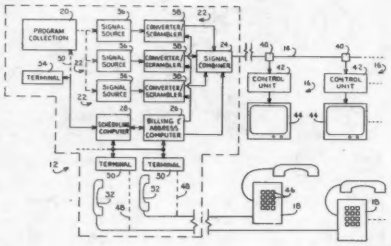
1. A method for identifying an unauthorized copy of a protected program transmitted over a communications link via a signal from a transmitter to a subscriber decoder in a subscription television system, comprising at the transmitter the step of inserting a character in a control signal stream transmitted concurrently with the protected program, and at the receiver the step of responding to said control character by writing a pre-assigned subscriber-specific identification to a screen for displaying said protected program during display or to a copier for making the unauthorized copy thereof, the unauthorized copy made by said copier from the supplied signal for displaying said protected program recording said subscriber-specific information.

4,890,320

TELEVISION BROADCAST SYSTEM FOR SELECTIVE TRANSMISSION OF VIEWER-CHOSEN PROGRAMS AT VIEWER-REQUESTED TIMES

H. Vincent Monslow, 11815 Rosehill Rd., Overland Park, Kans. 66210, and Steven R. Dickey, 2009 W. 103rd St., Leawood, Kans. 66206

Filed Jun. 9, 1988, Ser. No. 204,585
Int. Cl.[4] H04N 7/167
U.S. Cl. 380—10 13 Claims



11. In a television transmission system using land lines such as coaxial cables, fiber optic cables, and the like for transmitting programs thereover for reception by a plurality of television receivers coupled in common with said land lines, the system further including communicating means for receiving information over land lines from the viewers, the land lines including at least one section having plural receivers coupled therewith, the improvement comprising:

a collection of stored programs stored on a medium allowing selective reproduction and real-time transmission thereof over the land lines for reception and viewing thereof by selected receivers;

receiving means operably associated with the communicating means for receiving information from plural requesting viewers, said information including each requesting viewer's choice of a program chosen from said collection and a requested time for viewing of said program on a receiver associated with said requesting viewer;

selecting means operably associated with said collection and operably associated with and responsive to said receiving means for selecting a given said chosen program from said collection;

transmitting means operably associated with said selecting means and coupled with said section of land lines for transmission of said given chosen program over said section at said requested time for reception by and viewing on all receivers coupled to the section and associated with a request for said chosen program at a common requested time; and

means for preventing transmission of the chosen program over any remaining portion, if any, of the land lines.

4,890,321

COMMUNICATIONS FORMAT FOR A SUBSCRIPTION TELEVISION SYSTEM PERMITTING TRANSMISSION OF INDIVIDUAL TEXT MESSAGES TO SUBSCRIBERS

Nigel Seth-Smith; Cameron Bates; Samson Lim; William van Rassel; Robert Yoneda, all of Toronto, and Keith Lucas, Richmond Hill, all of Canada, assignors to Scientific Atlanta, Inc., Atlanta, Ga.

Continuation of Ser. No. 883,310, Jul. 8, 1986, abandoned. This application Sep. 30, 1988, Ser. No. 253,320
Int. Cl.[4] H04N 7/167, 7/10, 7/04
U.S. Cl. 380—20 13 Claims

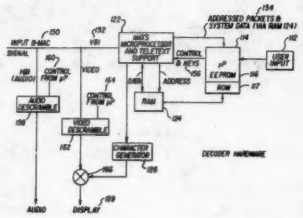
1. A method of transmitting individual data in packets to plural decoders of a television subscription system, each decoder receiving the same addressed data packet, said method comprising the steps of:

assigning groups of decoders to membership in banks of decoders;

assigning a bank identification number address to all decoders in a given bank of decoders;

assigning an individual member code comprising n bits to each of the decoders in each bank;

transmitting an addressed data packet including said bank identification number address to the decoders of said bank,



said data packet including a data field, said data field having a predetermined format of at least 2^n packet enable bits wherein the number of packet enable bits 2^n is equal to or greater than the number of decoders assigned to a given bank, values of said bits in said data field being assigned to convey data to be transmitted to said plural decoders; and

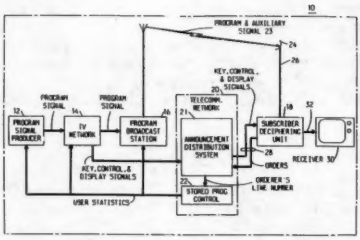
using said individual member code to point to one or more packet enable bits in said data field for status interpretation at said decoder to which said individual member code is assigned.

4,890,322

METHOD AND APPARATUS FOR SUBSCRIPTION BROADCAST

Thomas L. Russell, Jr., Colts Neck, N.J., assignor to American Telephone and Telegraph Company, New York, N.Y. and AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 582,966, Feb. 23, 1984, abandoned. This application Aug. 17, 1988, Ser. No. 235,723
Int. Cl.[4] H04N 7/167; H04H 1/00
U.S. Cl. 380—20 11 Claims



8. An arrangement for controlling the acquisition of an enciphered program signal representative of a particular program, said enciphered program signal being of a predetermined duration and being transmitted to a plurality of subscriber units each having access to a priorly stored common deciphering key, said arrangement comprising

means for returning to individual ones of said subscriber units who have requested receipt of said program signal a predetermined deciphering key operable for deciphering said enciphered program signal, said predetermined dura-

tion comprising at least two predefined intervals of time, and

means thereafter operative during a first one of said at least two predefined intervals for transmitting said program signal in a form that is decipherable using said common deciphering key and operative during a succeeding second one of said at least two predefined intervals for transmitting said program signal in a form that is decipherable using said predetermined deciphering key.

4,890,323

DATA COMMUNICATION SYSTEMS AND METHODS

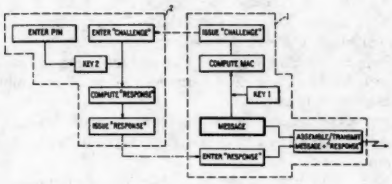
Henry J. Beker, Wokingham; Paul W. Halliden, Salisbury, and John M. K. Friend, Purlieu, all of England, assignors to Racal-Guardata Limited, Middlesex, England

Filed May 20, 1987, Ser. No. 52,257

Claims priority, application United Kingdom, May 22, 1986, 8612519

Int. Cl.[4] H04K *1/00*

U.S. Cl. 380—25 8 Claims



1. A method of secure message transmission from a terminal apparatus to a remote receiving station in a communications system, which involves appending to a message to be transmitted an authentication code comprising substantially fewer data bits than in the message and the value of which depends upon both the information in the message and information representing the identity of the sender, and wherein the authentication code is produced by a method comprising the steps of: computing within the terminal apparatus by first processing means a first code the value of which depends upon the information within the message and comprising substantially fewer data bits than in said message; issuing that code to the sender; computing a second code from said first code and from information representing the identity of the sender, said second code comprising substantially fewer data bits than in said message, by second processing means within a token assigned to the sender and which means can be actuated to perform the computation of said second code only upon recognition of a correct input indicative of the authority of the sender; and entering said code into the terminal apparatus, that code or a derivative thereof constituting the authentication code; and which comprises at the receiving station repeating the computation of an authentication code from the received message by means replicating the computations of said first and said second processing means, and comparing the authentication code thus computed with the authentication code received, thereby to permit authentication of the received message and of the identity of the sender.

4,890,324

ENCIPHERING/DECIPHERING METHOD AND ARRANGEMENT FOR PERFORMING THE METHOD

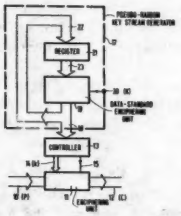
Cornelis J. A. Jansen, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Filed Nov. 6, 1987, Ser. No. 118,384

Claims priority, application Netherlands, Nov. 11, 1986, 8602847

Int. Cl.[4] H04L *9/02*

U.S. Cl. 380—43 18 Claims



13. An enciphering apparatus comprising:

key stream generating means for generating a pseudo-random key stream;

enciphering means receptive of a key and an instruction command for enciphering an input character with the key by an enciphering operation determined by said instruction command; and

control means receptive of the key stream for deriving successive keys and successive instruction commands from the key stream and for applying successive key-instruction command pairs to said enciphering means thereby controlling enciphering of a character sequence with successive characters enciphered with different keys and by different enciphering operations.

4,890,325

SPEECH CODING TRANSMISSION EQUIPMENT

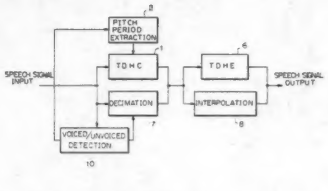
Tomohiko Taniguchi, Wakayama; Kohei Iseda, Yokohama; Koji Okazaki, Kawasaki; Fumio Amano, Tokyo, and Shigeyuki Unagami, Atsugi, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Feb. 18, 1988, Ser. No. 156,882

Claims priority, application Japan, Feb. 20, 1987, 62-037304

Int. Cl.[4] G10L *5/00*

U.S. Cl. 381—34 6 Claims



1. Speech coding transmission equipment having a transmitting portion transmitting speech signal processed by time domain harmonic compression and encoded to produce a coded signal, and a receiving portion decoding the coded signal, and expanding and reproducing the speech signal to a bandwidth existing before compression of the speech signal,

said transmitting portion comprising:

voiced/unvoiced determination means for distinguishing whether the speech signal is in voiced periods or unvoiced periods,

pitch period extraction means for extracting a pitch period of the speech signal during the voiced period,

time domain harmonic compression means for obtaining and outputting a first compressed speech signal having a length of one pitch period from the speech signal included in a plurality of pitch periods,

decimation means for obtaining and outputting a second compressed speech signal having a length of one sample period from the speech signal included in a plurality of sample periods during the unvoiced periods,

said receiving portion comprising:

time domain harmonic expansion means for expanding, in the time domain, each pitch period of the first compressed speech signal into a plurality of pitch periods of a restored speech signal, and

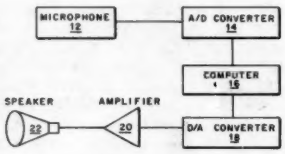
interpolation means for expanding, in the time domain, each sample period of the second compressed speech signal into a plurality of sample periods of the restored speech signal.

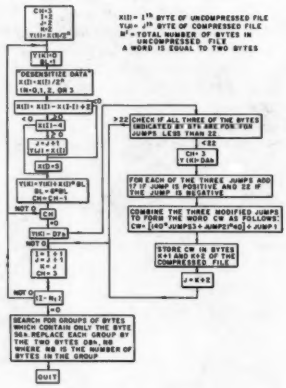
4,890,326

METHOD FOR COMPRESSING DATA

James A. Euler, Knoxville, Tenn., assignor to Rubiyat Software, Inc., Knoxville, Tenn.

Filed Mar. 3, 1988, Ser. No. 163,658
Int. Cl.[4] G01L *3/02*; H03M *7/38*
U.S. Cl. 381—35 **8 Claims**





1. A method for compressing and decompressing analog voice data for storage in a computer memory comprising:

converting the analog voice data to digital voice data comprising a series of digital numbers;

determining the difference jumps between adjacent numbers in the digital voice data;

assigning a code value to each jump;

grouping the codes into groups of adjacent codes and calculating a single compression number for each group that is unique for any combination of code values in the group;

storing at least the compression numbers as compressed data; and

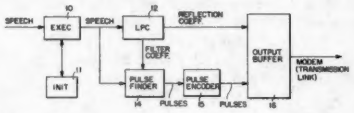
reading the compressed data and selectively utilizing the stored compression numbers to determine codes of each group.

4,890,327

MULTI-RATE DIGITAL VOICE CODER APPARATUS

John Bertrand, Upper Nyack, N.Y., and Matthew J. Noah, Detroit Lakes, Minn., assignors to ITT Corporation, New York, N.Y.

Filed Jun. 3, 1987, Ser. No. 57,474
Int. Cl.[4] G10L *7/02*
U.S. Cl. 381—38 **15 Claims**



1. Apparatus for converting analog speech into a digital signal for transmission of said digital signal over a conventional communications channel, comprising:

pre-emphasis means responsive to said analog speech at an input for providing at an output an array of pre-emphasized speech samples,

memory means coupled to said pre-emphasis means for storing said array of samples in contiguous storage locations,

linear predictive coder means coupled to the output of said memory means and responsive to said stored samples for providing a first array of reflection coefficients at a first output and a second array of filter coefficients at a second output,

pole broadening means coupled to said linear predictive coder means and responsive to said filter coefficient array for providing an array of filter coefficients having a broadened bandwidth including means for multiplying each of said filter coefficients in said array by a given factor,

a pre-emphasis correction means coupled to said pole broadening means for receiving at an input said array of broadened bandwidth filter coefficients for providing at an output an array of corrected filter coefficients,

pulse processing means coupled to said pre-emphasis means and said pre-emphasis correction means and responsive to said pre-emphasis speech samples and said corrected filter coefficients for providing at a first output a first series of pulses indicative of pulse amplitude and at a second output a second series of pulses indicative of pulse location,

encoder means coupled to said first and second outputs of said pulse processing means for providing a stream of pulses indicative of a product code of said first and second series of pulses, and

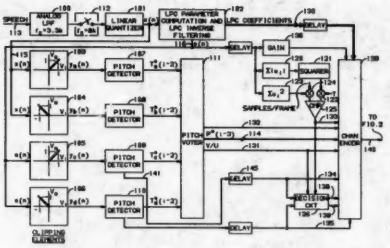
output buffer means having a first input coupled to said first output of said linear predictive coding means for receiving said reflection coefficients and a second input coupled to said encoder means for receiving said stream of pulses for providing at an output a digital signal of a given length bit stream having a bit rate determined according to said communications channel.

4,890,328

VOICE SYNTHESIS UTILIZING MULTI-LEVEL FILTER EXCITATION

Dimitrios P. Prezas, Park Ridge, and David L. Thomson, Warrenville, both of Ill., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 28, 1985, Ser. No. 770,631
Int. Cl.[4] G10L *7/02*
U.S. Cl. 381—38 24 Claims



1. A processing system for the analysis and synthesis of human speech comprising:

means for storing a plurality of speech frames each having a predetermined number of evenly spaced samples of instantaneous amplitudes of said speech;

means for calculating a set of speech parameter signals defining a vocal tract for each speech frame;

means for designating a first subset of said plurality of speech frames as voiced and a second subset of said plurality of speech frames as unvoiced;

means for generating pitch type excitation information for each frame of said first subset of said plurality of speech frames;

means for producing a plurality of other types of excitation information for each frame of said second subset of said plurality of speech frames;

means responsive to said designating means designating each frame of said first subset of said plurality of speech frames for combining said pitch type excitation information and said set of said speech parameter signals;

said combining means further comprises means responsive to said designating means designating each frame of said second subset of said plurality of speech frames for selecting one of said other types of excitation information and means for combining the selected one of said other types of excitation information with the set of said speech parameter signals; and

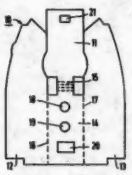
means for communicating said combined excitation information including said pitch type excitation information and the set of said speech parameter signals for each frame of said first subset of said plurality of speech frames and said combined excitation information including the selected one of said other types of excitation information and the set of said speech parameter signals for each of frame of said second subset of said plurality of speech frames.

4,890,329

HEARING AID COMPRISING PRINTED CIRCUIT BOARD

Ehrenfried Erbe, Effeltrich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 6, 1988, Ser. No. 202,829
Claims priority, application Fed. Rep. of Germany, Jun. 26, 1987, 8708893[U]
Int. Cl.[4] H04R *25/00*
U.S. Cl. 381—68.7 14 Claims



12. A hearing aid, comprising:

a housing having a printed circuit board arranged interiorly thereof;

said printed circuit board having a base part with at least a first hearing aid component attached thereto, a flexible extension arm means connected to the base part for at least partially folding over said at least first hearing aid component, and wherein said flexible extension arm means overlies and is positioned over a first surface of the printed circuit board;

first and second wings extending from said base part and wherein bending edges of the wing means are at right angles to a bending edge of the extension arm means, said flexible wings being bent at approximately 90° angle with respect to said base part;

at least a second hearing aid component attached to the wings and at least a third hearing aid component is attached to a surface of the extension arm means facing away from the base part, and wherein means are provided for attaching the first hearing aid component to the base part; and

said means for attaching the first hearing aid component comprising a carrier having an associated interlocking part, and wherein the extension arm means comprises retention means for holding the extension arm means in a 180° fold-over locked position.

4,890,330

HEARING AID WITH INTERCHANGEABLE BATTERY COMPARTMENT AND AUDIO CONNECTION

Serge-E-H Meyer, Oberlunkhofen, Switzerland, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

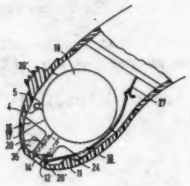
Filed Aug. 2, 1988, Ser. No. 227,291
Claims priority, application Switzerland, Aug. 11, 1987, 3067/87
Int. Cl.[4] H04R *25/00*
U.S. Cl. 381—69.2 5 Claims

1. A hearing aid comprising:

a housing having an attachment element; and

a set of removably engageable components including a standard battery compartment removably engageable with said attachment element to form a unit with said housing, and an audio connection including a battery compartment,

said audio connection also being removably engageable with said attachment element of said housing to form a



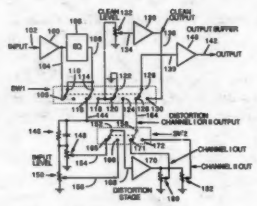
unit with said housing in place of said standard battery compartment.

4,890,331

SPECIALIZED AMPLIFIER SYSTEMS FOR MUSICAL INSTRUMENTS

James W. Brown, Sr., and Jack C. Sondermeyer, both of Meridian, Miss., assignors to Peavey Electronics Corporation, Meridian, Miss.

Filed Jan. 11, 1988, Ser. No. 142,020
Int. Cl.[4] H03F *1/34*; H03G *3/02*
U.S. Cl. 381—120 **4 Claims**



1. A specialized audio amplifier system which comprises the combination of three separate and independent amplifier channel signals comprising first amplifier means receiving an audio signal input for providing a substantially undistorted and amplified rhythm mode channel signal which is amplified with respect to the audio input signal, and second amplifier means receiving the audio signal input for providing a plurality of at least two separate distortion lead mode channel signals each of which is distorted and amplified with respect to the audio input signal, and switching means for selecting any one of the channel signals as a selected output of the amplifier system while independently setting the amplification of the rhythm mode channel signal when selected and for setting both distortion level and output volume of a distortion lead mode channel signal when selected.

4,890,332

APPARATUS FOR JUDGING QUALITY OF MOBILE DATA COMMUNICATION

Chusei Takahashi, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

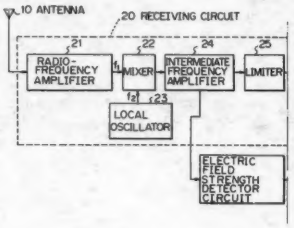
Continuation-in-part of Ser. No. 877,452, Jun. 23, 1986, abandoned. This application Jun. 27, 1988, Ser. No. 223,117
Claims priority, application Japan, Jun. 29, 1985, 60-141537
Int. Cl.[4] H04B *17/00*
U.S. Cl. 455—67 **4 Claims**

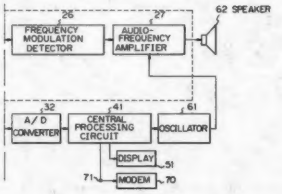
1. An apparatus for judging a quality of mobile data communication, said apparatus being coupled to a modem which conducts the data communication, said apparatus comprising:

(a) an electric field strength detector means for amplifying an incoming electric wave and for detecting a signal strength of the received electric field;

(b) a data communication judgment means for comparing a predetermined judgment reference value of a communication limit in a data communication with an output from said electric field strength detector and for providing an output in response to the comparison;

(c) a display means for effecting a visible display when said signal strength of the received electric field is more than said predetermined judgment reference value;





(d) an audible tone means for producing an audible tone when said signal strength of the received electric field is less than said predetermined judgment reference value; and

(e) a digital output terminal means connected to said output of said data communication judgment means for outputting a predetermined digital control signal to the modem so as to control starting and stopping of the modem in response to the result of the comparison of the signal strength of the received electric field with the predetermined judgment reference value.

4,890,333

TEST BENCH FOR WIDEBAND RADIO LINK

Jean-Yves Delahaye, 14, avenue Pasteur, 92170 Vanves, and Jean-Paul Vinson, 8, rue Descartes, 92190 Meudon, both of France

Filed Aug. 11, 1987, Ser. No. 84,103
Claims priority, application France, Aug. 14, 1986, 86 11759
Int. Cl.[4] H04B *17/00*
U.S. Cl. 455—67 **11 Claims**

1. A radio link test bench system, comprising:

(1) transmission station means, including:

(a) means including a measurement oscillator (2) for supplying a pulse signal (e_1) having a predetermined intermediate frequency (F_m);

(b) generator means (13) for generating:

(1) an analog exploration signal (V_B) having a predetermined low frequency, and

(2) a marking pulse signal (e_2) synchronous with said exploration signal;

(c) modulator means (51) for modulating said intermediate frequency pulse signal (e_1) during pulses of said mark-

ing pulse signal (e_2) to derive a periodically modulated analog measurement signal (V_m);

(d) summing means (3) for adding said exploration signal (V_B) and said periodically modulated measurement signal (V_m) to form a wobbulation control signal (e_w);

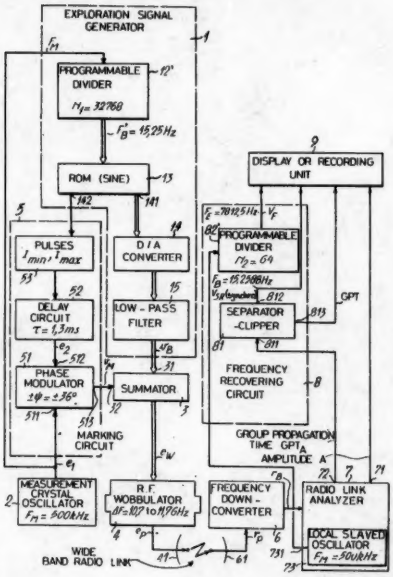
(e) radio frequency wobbulation means (4) controlled by said wobbulation control signal for producing a wobulated signal (e_p); and

(f) means 41) for transmitting said wobbulated signal; and

(2) receiving station means including;

(a) means (61) for receiving said wobbulated signal;

(b) radio link analyzer means (7) for analyzing said wobbulated signal to define:



(1) a first signal (A) that is a function of a parameter of the received wobbulated signal;

(2) a second signal (GPT_A) corresponding with the sum of a signal (GPT) proportional to the group propagation time and a pulse signal proportional to the marking pulse signal (e_2); and

(c) means for deducing from said second signal (GPT_A);

(1) said group propagation signal (GPT); and

(2) a synchronizing signal (V_{SR}) that is a function of said marking pulse (e_2) and exploration (V_B) signals; and

(d) indicator means (9) for indicating at least one of said parameter (A), synchronous (V_{SR}) and group propagation time (GPT) signals.

4,890,334

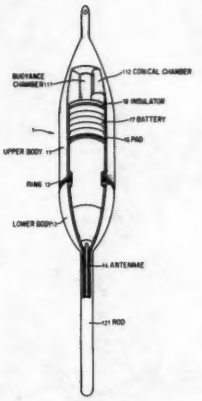
BUOY STRUCTURE FOR DETECTING FISHING GROUNDS

Fong K. Chien, 5F, No. 3, Lane 359, Chung-Shan Rd., Sec. 2, Chung Ho., Taipei, Taiwan

Filed Feb. 26, 1988, Ser. No. 161,452

Int. Cl.[4] H04B 1/38

U.S. Cl. 455—89 **1 Claim**



1. A buoy structure for detecting fishing grounds comprising:

an upper body defining an internal centrally located buoyancy adjusting chamber and a conical chamber at one end thereof;

an ultrasonic wave transmitting transducer and an ultrasonic wave receiving transducer disposed in a conical chamber;

an insulator disposed between the conical chamber and buoyancy adjusting chamber, and the opposite end of said body, and an inner thread at the opposite end;

a lower body having a rod-like extension at one end and an FM antenna mounted in the extension with an end of said antenna extending from the extension into said body and forming an arc, the end of said body opposite the extension mounting an inner flange having outer threads thereon and a waterproof ring slidably mounted over said flange;

a PC board mounted in said lower body having a contact point at one end in contact with the arc of the FM antenna, and the opposite end of said PC board mounting a pad and a rechargeable battery;

said lower body end being threadedly received in said upper body end so that the battery will be disposed between said pad and said insulator;

means for transmitting an ultrasonic wave from said transmitting transducer and for receiving the echo of the sound wave transmitted at said receiving transducer;

means for detecting, amplifying and integrating the echo to produce a DC voltage output and for producing from said output a signal of acoustic frequency being transmitted through the FM antenna whereby when the upper and lower bodies are assembled in threaded engagement, a buoy will be produced which can transmit a signal for determining the status of a fishing ground.

DESIGN PATENTS

GRANTED DEC. 26, 1989

ERRATA

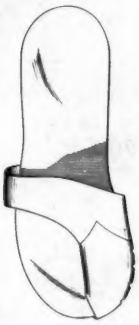
For CLASS	See PATENT NO.
D03-062	305,210

DESIGNS

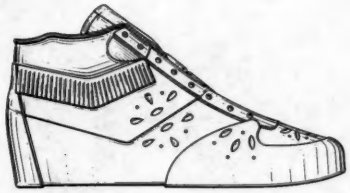
DECEMBER 26, 1989

305,175
FUR PELT FOR APPAREL OR THE LIKE
Roberto Masci, Rome, Italy, assignor to Fendi Paola & S.Ile S.A.A., Roma, Italy
Filed Nov. 25, 1986, Ser. No. 934,988
Claims priority, application Italy, May 27, 1986, 35848/86[U]
Term of patent 14 years
U.S. Cl. D2—25

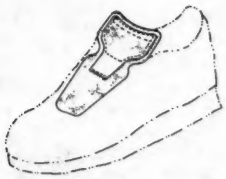
305,176
SANDAL
Leslie A. Campbell, 32 Phillips St., Marblehead, Mass. 01945
Filed Dec. 22, 1986, Ser. No. 945,317
Term of patent 14 years
U.S. Cl. D2—270



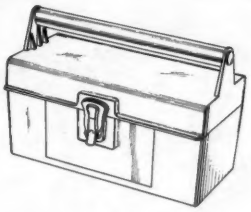
305,177
SHOE UPPER
Patricia D. Quan, Hermosa Beach, Calif., assignor to L.A. Gear, Inc., Los Angeles, Calif.
Filed Feb. 3, 1988, Ser. No. 151,783
Term of patent 14 years
U.S. Cl. D2—314



305,178
LAMINAL TONGUE POCKET FOR FOOTWEAR
Raymond F. Tonkel, St. Louis County, Mo., assignor to Kangaroos U.S.A., Inc., St. Louis, Mo.
Filed Feb. 19, 1987, Ser. No. 16,638
Term of patent 14 years
U.S. Cl. D2—315



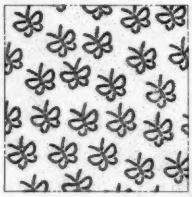
305,179
WORK STATION CONTAINER
Kenneth D. Collister, Elkhart, Ind., assignor to Miles Inc., Elkhart, Ind.
Filed Jun. 13, 1986, Ser. No. 874,378
Term of patent 14 years
U.S. Cl. D3—30.1



305,180
COMBINED KEY HOLDER AND REMOTE CONTROL TRANSMITTER FOR ANTITHEFT APPARATUS
Giovanni Arduini; Lorenzo Bonfanti, and Gianfranco Salvemini, all of Milan, Italy, assignors to Delta Elettronics s.p.a., Varese, Italy
Filed Feb. 11, 1987, Ser. No. 13,386
Claims priority, application Italy, Aug. 11, 1986, 60945/86[U]
Term of patent 14 years
U.S. Cl. D3—62

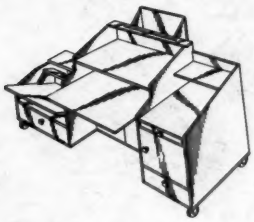
305,181
EMBOSSED TISSUE OR SIMILAR ARTICLE
J. Steven Veith, Menasha, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.
Filed May 21, 1987, Ser. No. 53,432
Term of patent 14 years
U.S. Cl. D5—53

305,182
EMBOSSED TISSUE OR SIMILAR ARTICLE
Raju B. Peddada, Neenah, and Robert A. Drew, Appleton, both of Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.
Filed Feb. 6, 1987, Ser. No. 12,220
Term of patent 14 years
U.S. Cl. D5—53



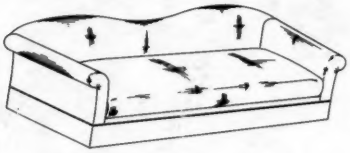
305,183
ARMCHAIR
Raymond M. Carter, Marina Del Ray; Thomas E. Violand, Jr., Ventura, and Charles W. Pelly, Calabasas, all of Calif., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.
Filed Oct. 7, 1986, Ser. No. 916,672
Term of patent 14 years
U.S. Cl. D6—366

305,185
COMPUTER WORK STATION
Juan E. Cruz, Rio Piedras, P.R., assignor to Commonwealth of Puerto Rico, San Juan, P.R.
Filed May 18, 1987, Ser. No. 50,381
Term of patent 14 years
U.S. Cl. D6—426

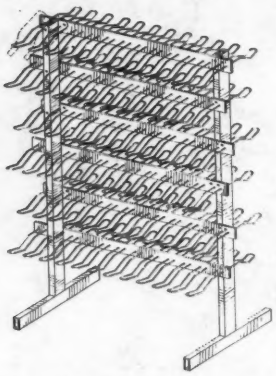


305,186
VIDEO CABINET OR SIMILAR ARTICLE
Paul S. Bush, Lakewood, N.Y.; Richard Bova, Corry, Pa., and Bruce Anderson, Jamestown, N.Y., assignors to Bush Industries, Inc., Jamestown, N.Y.
Division of Ser. No. 835,453, Mar. 3, 1986, Pat. No. Des. 301,814. This application Oct. 31, 1988, Ser. No. 264,369
Term of patent 14 years
U.S. Cl. D6—436

305,184
SOFA
Bill G. Coley, Conover, N.C., assignor to Lee Industries, Newton, N.C.
Filed Nov. 21, 1986, Ser. No. 933,686
Term of patent 14 years
U.S. Cl. D6—381

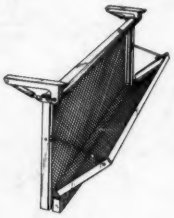


305,187
BOTTLE STORAGE RACK
David T. Kaufman, Jr., Jeffersontown, Ky., assignor to Lesco Design & Manufacturing Company, Inc., LaGrange, Ky.
Filed Oct. 29, 1986, Ser. No. 924,599
Term of patent 14 years
U.S. Cl. D6—465

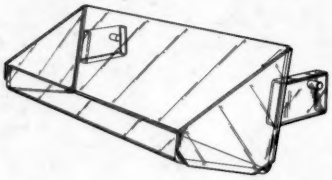


305,188
TABLE
Willi van Engeland, Almelo, Netherlands, assignor to 501 Staat Der Nederlanden, Netherlands
Continuation of Ser. No. 838,055, Feb. 28, 1986, abandoned.
This application Nov. 7, 1988, Ser. No. 268,606
Claims priority, application Benelux, Aug. 29, 1985, 60330-00
Term of patent 14 years
U.S. Cl. D6—487

305,189
COMPUTER CABLE SUPPORT RACK FOR MOUNTING UNDER A DESK TOP
Kurt Scherrer, Münsingen, Switzerland, assignor to U. Schärer Söhne AG (USM), Münsingen, Switzerland
Filed Apr. 7, 1987, Ser. No. 35,296
Claims priority, application Switzerland, Oct. 8, 1986, 115,459
Term of patent 14 years
U.S. Cl. D6—510

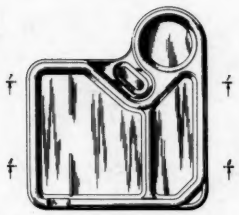


305,190
DISPLAY SHELF
Russell K. Winter, Crownsville; Thomas D. Harvey, Rockville; Nedim Savas, Bethesda, and Richard S. Kain, Woodbine, all of Md., assignors to Russell William, Ltd., Odenton, Md.
Filed Sep. 17, 1987, Ser. No. 97,916
Term of patent 14 years
U.S. Cl. D6—567

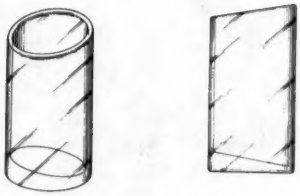


305,191
CAKE AND ICE CREAM DISH
Steven Wasserman, Baltimore, Md., assignor to Artform Industries, Baltimore, Md.
Filed Dec. 1, 1986, Ser. No. 936,657
Term of patent 14 years
U.S. Cl. D7—1

305,192
PARTY PLATE
Jan A. van Erkel, 3140 NE. 165th St., N.Miami Beach, Fla. 33160
Filed Nov. 4, 1986, Ser. No. 926,778
Term of patent 14 years
U.S. Cl. D7—1

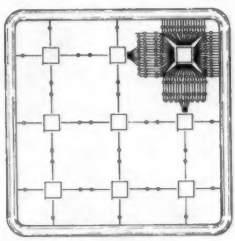


305,193
TUMBLER
Morteza Sajadieh, 4604 Los Feliz Bl. #210, Los Angeles, Calif. 90027
Filed Jun. 16, 1986, Ser. No. 875,755
Term of patent 14 years
U.S. Cl. D7—6



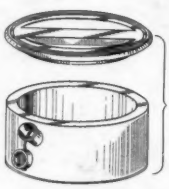
305,194
CUP
Jean-Jacques Durand, LaBute, 62510, Arques, France
Filed Sep. 28, 1987, Ser. No. 101,560
Term of patent 14 years
U.S. Cl. D7—9

305,195
DRINK COASTER
Lawrence A. Towers, 1528 E. Olive St., Shorewood, Wis. 53211
Filed Apr. 27, 1987, Ser. No. 42,938
Term of patent 14 years
U.S. Cl. D7—45

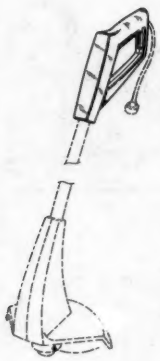


305,196
COMBINED PEPPER MILL AND SALT SHAKER
Paul Persoff, 15 E. 30th St., New York, N.Y. 10015
Filed Feb. 21, 1986, Ser. No. 834,480
Term of patent 14 years
U.S. Cl. D7—57

305,197
TORTILLA WARMER
Oscar R. Valdes, 1241 Fifth Ave. #29B, Chula Vista, Calif. 92010
Filed Dec. 22, 1986, Ser. No. 944,612
Term of patent 14 years
U.S. Cl. D7—354

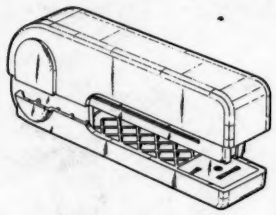


305,198
HANDLE FOR AN ELECTRIC STRING TRIMMER OR THE LIKE
John O. White, Minneapolis, and Floyd D. Niskanen, Golden Valley, both of Minn., assignors to The Toro Company, Minneapolis, Minn.
Filed May 12, 1988, Ser. No. 193,002
Term of patent 14 years
U.S. Cl. D8—8

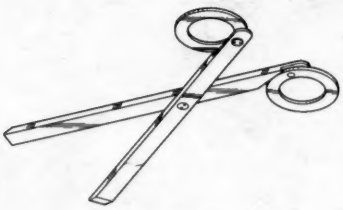


305,199
CALCULATOR BUTTON PUSHER
Victor L. Jackson, Norman, Okla., assignor to Ecosystems, Inc., Norman, Okla.
Filed Mar. 10, 1986, Ser. No. 842,050
Term of patent 14 years
U.S. Cl. D8—14

305,200
STAPLER
Stefan Arns, Göteborg, and Lars-Göran Rosenblad, Grönna, both of Sweden, assignors to Isaberg AB, Hestra, Sweden
Filed Jun. 2, 1987, Ser. No. 56,672
Claims priority, application Sweden, Dec. 17, 1986, 86-2987
Term of patent 14 years
U.S. Cl. D8—50



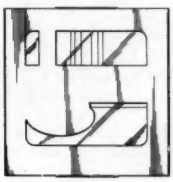
305,201
SCISSORS
Kazuo Kawasaki, Fukui, Japan, assignor to Ex-Design Corporation, Fukui, Japan
Filed Sep. 23, 1987, Ser. No. 99,987
Term of patent 14 years
U.S. Cl. D8—57



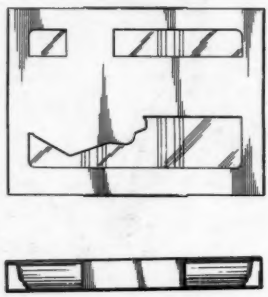
305,202
MULTI-VIAL LEVEL ATTACHMENT FOR HAND-HELD DRILLS
David E. Johnson, Lancaster, Ohio, assignor to The Arcair Company, Lancaster, Ohio
Filed Apr. 24, 1986, Ser. No. 857,618
Term of patent 14 years
U.S. Cl. D8—70

305,203
PERFORATED MARGIN REMOVER FOR COMPUTER PAPER OR THE LIKE
Ray Loesche, P.O. Box 1112, Palm City, Fla. 34990
Filed Feb. 6, 1987, Ser. No. 12,031
Term of patent 14 years
U.S. Cl. D8—98

305,204
PACKAGE
Yolanda M. Reifein, and Paul E. Grindrod, both of Madison, Wis., assignors to Oscar Mayer Foods Corporation, Madison, Wis.
Filed Sep. 18, 1987, Ser. No. 99,834
Term of patent 14 years
U.S. Cl. D9—418



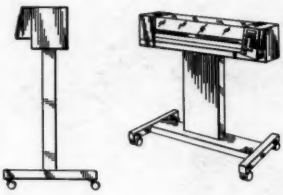
305,205
PACKAGE
Paul E. Grindrod, and Yolanda M. Reifein, both of Madison, Wis., assignors to Oscar Mayer Foods Corporation, Madison, Wis.
Filed Sep. 18, 1987, Ser. No. 99,835
Term of patent 14 years
U.S. Cl. D9—418



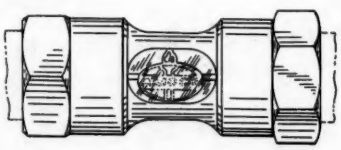
305,206
TWO FLAP CONTAINER CAP
John R. Hickman, Talmadge, Ohio, and Nickolas J. Kriska, Laurel, Md., assignors to Weatherchem Corporation, Twinsburg, Ohio
Filed Aug. 25, 1986, Ser. No. 899,935
Term of patent 14 years
U.S. Cl. D9—449

305,207
TRAVEL ALARM CLOCK
Mitsuo Wada, Tokyo, Japan, assignor to Seikosha Co., Ltd., Tokyo, Japan
Filed Aug. 24, 1987, Ser. No. 88,943
Claims priority, application Japan, Feb. 25, 1987, 62-7108
Term of patent 14 years
U.S. Cl. D10—15

305,208
PLOTTER
Stephen O. Ross, La Jolla, and Charles A. Bastyr, San Diego, both of Calif., assignors to Enter Computer, Inc., San Diego, Calif.
Filed Dec. 22, 1986, Ser. No. 944,537
Term of patent 14 years
U.S. Cl. D10—46



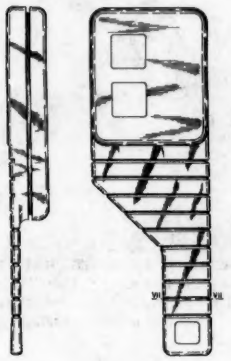
305,209
FLOW INDICATOR FOR A FUEL DISPENSER
Norman D. Esau, Naperville, Ill., assignor to Amoco Corporation, Chicago, Ill.
Filed Apr. 24, 1986, Ser. No. 845,789
Term of patent 14 years
U.S. Cl. D10—96



305,210
COMBINED KEY HOLDER AND REMOTE CONTROL TRANSMITTER FOR ANTITHEFT APPARATUS

Giovanni Arduini; Lorenzo Bonfanti, and Gianfranco Salvemini, all of Milan, Italy, assignors to Delta Elettronics s.p.a., Varese, Italy

Filed Feb. 11, 1987, Ser. No. 13,387
Claims priority, application Italy, Aug. 11, 1986, 60943/86[U]
Term of patent 14 years
U.S. Cl. D3—62



305,211
DESK TOP MONITOR AND CONTROL UNIT FOR A TELEVISION SURVEILLANCE SYSTEM

Donald N. Horn, Cold Spring Harbor, N.Y., assignor to Vicon Industries, Melville, N.Y.

Filed Oct. 24, 1986, Ser. No. 923,721
Term of patent 14 years
U.S. Cl. D10—106

305,212
STOP SIGN WITH LATERAL IDENTIFICATION PANELS FOR CROSS TRAFFIC

Howard G. Rowebottom, 4875 Paradise Dr., Tiburon, Calif. 94920

Filed Nov. 7, 1988, Ser. No. 267,763
Term of patent 14 years
U.S. Cl. D10—109

305,213
ROAD HAZARD WARNING SIGN
Thomas E. Hughes, 2903 Fairhope, Houston, Tex. 77025
Filed Feb. 5, 1987, Ser. No. 11,132
Term of patent 14 years
U.S. Cl. D10—109

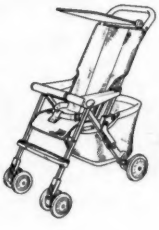
305,214
TWO FINGER RING
Corene G. Campbell, 22731 Avalon, Lake Forest, Calif. 92630
Filed Sep. 15, 1986, Ser. No. 907,617
Term of patent 14 years
U.S. Cl. D11—26

305,215
LAPEL BUTTON
Robert J. De brey, 4502 Browndale Ave., Edina, Minn. 55424
Filed Jul. 16, 1987, Ser. No. 74,014
Term of patent 14 years
U.S. Cl. D11—99

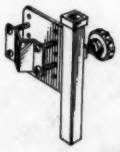
305,216
CRUCIFORM KEY MEDAL
Tommy Aucoin, Metairie, La., assignor to Redemptorist Vice-Provincialate of New Orleans, Inc., New Orleans, La.
Filed Nov. 5, 1987, Ser. No. 117,083
Term of patent 14 years
U.S. Cl. D11—105

305,217
EMERGENCY TRANSPORT BRACE FRAME
Oscar S. Cunanan, 102 Dunedin Ct., Cary, N.C. 27511
Filed Apr. 24, 1987, Ser. No. 41,917
Term of patent 14 years
U.S. Cl. D12—128

305,218
BABY STROLLER
Shinroku Nakao, Kanagawa; Yoshiyasu Ishii, and Hiroaki Matsuda, both of Tokyo, all of Japan, assignors to Combi Co., Ltd., Tokyo, Japan
Filed Feb. 27, 1987, Ser. No. 19,713
Claims priority, application Japan, Nov. 14, 1986, 61-44844
Term of patent 14 years
U.S. Cl. D12—129



305,219
ARM REST ENGAGABLE MOUNTING BRACKET FOR WHEELCHAIRS OR THE LIKE
Charles F. Wood, 8341 E. Foothill Dr., Peoria, Ariz. 85345
Filed Feb. 9, 1987, Ser. No. 13,732
Term of patent 14 years
U.S. Cl. D12—133

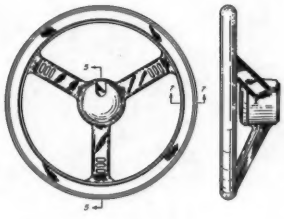


305,220
VEHICLE TIRE
Ian Kemp, Tamworth, England, assignor to SP Tyres UK Ltd., Birmingham, England
Filed Jul. 31, 1986, Ser. No. 891,385
Claims priority, application United Kingdom, Feb. 7, 1986, 1032113
Term of patent 14 years
U.S. Cl. D12—142

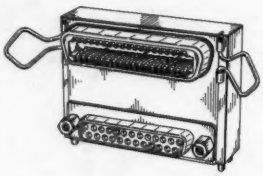
305,221
VEHICLE TIRE
Masaaki Minamitani, Osaka, Japan, assignor to The Ohtsu Tire & Rubber Co., Ltd., Osaka, Japan
Filed Apr. 13, 1987, Ser. No. 38,269
Claims priority, application Japan, Nov. 26, 1986, 61-46938
Term of patent 14 years
U.S. Cl. D12—147

305,222
COMBINED TIRE VALVE STEM AND CAP
Todd P. Geib, 530 Allens Creek Rd., Rochester, N.Y. 14618
Filed Jun. 1, 1987, Ser. No. 56,875
Term of patent 14 years
U.S. Cl. D12—153

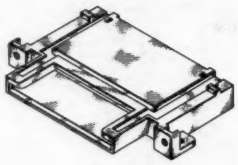
305,223
STEERING WHEEL
Gregory S. Breiding, Columbus, and Eugene G. Bruns, Maria Stein, both of Ohio, assignors to Crown Equipment Corporation, New Bremen, Ohio
Filed Nov. 2, 1987, Ser. No. 116,139
Term of patent 14 years
U.S. Cl. D12—176



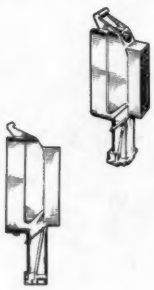
305,224
ELECTRICAL CONNECTOR
Masanori Iwashita, Ikoma, Japan, assignor to Hosiden Electronics Co., Ltd., Yao, Japan
Filed Oct. 9, 1987, Ser. No. 106,331
Claims priority, application Japan, Apr. 24, 1987, 62-16350
Term of patent 14 years
U.S. Cl. D13—24



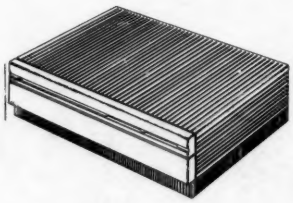
305,225
ELECTRICAL CONNECTOR
Yasuhiro Komatsu, Osaka, Japan, assignor to Hosiden Electronics Co., Ltd., Yao, Japan
Filed Jun. 26, 1987, Ser. No. 67,088
Claims priority, application Japan, Jan. 19, 1987, 62-1642
Term of patent 14 years
U.S. Cl. D13—24



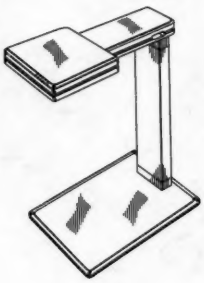
305,226
MULTIPOLAR ELECTRICAL BRANCH LINE CONNECTOR
Nuno R. M. de Figueiredo, Nybytorpsvägen 5, S-182 64 Djursholm, Sweden
Filed Apr. 28, 1986, Ser. No. 858,228
Claims priority, application Sweden, Nov. 13, 1985, 85-2763
Term of patent 14 years
U.S. Cl. D13—28



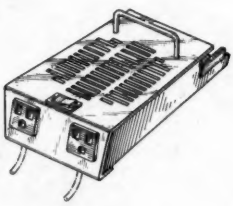
305,227
COMPUTER HOUSING
Hartmut H. Esslinger, Los Gatos, Calif., assignor to Apple Computer, Inc., Cupertino, Calif.
Filed May 11, 1987, Ser. No. 47,990
Term of patent 14 years
U.S. Cl. D14—100



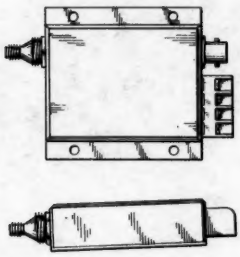
305,228
BAR CODE SCANNER OR SIMILAR ARTICLE
David M. J. Allgeier, Cumberland, Ohio, assignor to NCR Corporation, Dayton, Ohio
Filed Apr. 14, 1988, Ser. No. 181,339
Term of patent 14 years
U.S. Cl. D14—107



305,229
COMPUTER FAN
Dean L. Milani, Highland Park, Ill., assignor to Medical Research Laboratories, Niles, Ill.
Filed Aug. 1, 1986, Ser. No. 892,501
Term of patent 14 years
U.S. Cl. D14—114

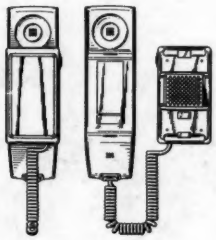


305,230
FIBER OPTIC VIDEO TRANSMITTER AND RECEIVER
Irwin Math, Great Neck, N.Y., assignor to Math Associates, Inc., Westbury, N.Y.
Filed Aug. 4, 1986, Ser. No. 892,407
Term of patent 14 years
U.S. Cl. D14—124

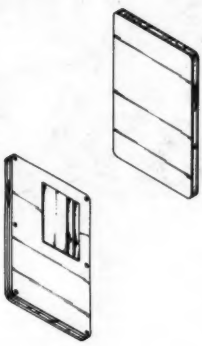


305,231
PORTABLE HANDSET RADIO TELEPHONE
Shigeru Sutoh, Saitama, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan
Filed Sep. 22, 1988, Ser. No. 247,588
Claims priority, application Japan, May 9, 1988, 63-17909
Term of patent 14 years
U.S. Cl. D14—138

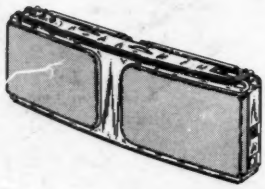
305,232
MOBILE TELEPHONE SET
Shigeru Sutoh, Saitama, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan
Filed Sep. 21, 1988, Ser. No. 247,322
Claims priority, application Japan, May 26, 1988, 63-20509; May 26, 1988, 63-20510; May 26, 1988, 63-20511
Term of patent 14 years
U.S. Cl. D14—138



305,233
RADIO PAGER
Isamu Sekine, Kawagoe, Japan, assignor to Kokusai Denki Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 4, 1987, Ser. No. 117,641
Claims priority, application Japan, May 19, 1987, 62-19358
Term of patent 14 years
U.S. Cl. D14—191



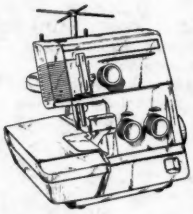
305,234
RADIO RECEIVER
Sies K. Brandsma, Eersel, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Jun. 18, 1987, Ser. No. 63,614
Claims priority, application United Kingdom, Dec. 22, 1986, 1038.910
Term of patent 14 years
U.S. Cl. D14—194



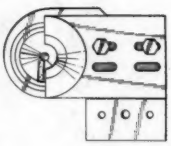
305,235
TELEPHONE RECEIVER CUSHION
Don M. Moore, N. Rte. 48, Morrisonville, Ill. 62546
Filed Jun. 12, 1987, Ser. No. 61,256
Term of patent 14 years
U.S. Cl. D14—249

305,236
AGRICULTURAL TRACTOR
Genichi Funabashi, Sennan, and Tetsuaki Hayashi, Osaka, both of Japan, assignors to Kubota, Ltd., Osaka, Japan
Filed Feb. 9, 1987, Ser. No. 12,222
Term of patent 14 years
U.S. Cl. D15—23

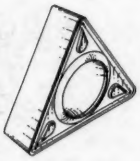
305,237
SEWING MACHINE
Nobufusa Kuroki, Machida, Japan, assignor to Janome Sewing Machine Co., Ltd., Tokyo, Japan
Filed Sep. 2, 1986, Ser. No. 903,113
Term of patent 14 years
U.S. Cl. D15—69



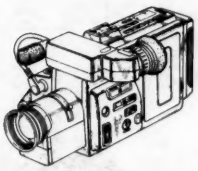
305,238
DRIVING UNIT FOR AN ELECTRODE SHAPING DEVICE
Joachim S. Aronsson, Hönö ; Oskar W. Leander, Gothenburg, and Erik R. Melin, Lerum, all of Sweden, assignors to Rotech Tooling AB, Gotenburg, Sweden
Filed May 26, 1987, Ser. No. 53,672
Claims priority, application Sweden, Dec. 11, 1986, 86-2949
Term of patent 14 years
U.S. Cl. D15—139



305,239
CUTTING TOOL INSERT
Kenneth L. Niebauer, Raleigh, N.C., assignor to Kennametal Inc., Latrobe, Pa.
Filed Jan. 22, 1988, Ser. No. 147,016
Term of patent 14 years
U.S. Cl. D15—139

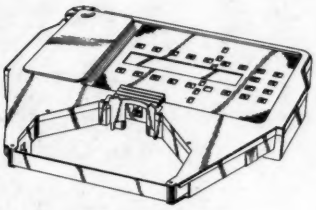


305,240
VIDEO CAMERA
Yuji Kondoh, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 26, 1986, Ser. No. 935,542
Claims priority, application Japan, May 29, 1986, 61-20740
Term of patent 14 years
U.S. Cl. D16—202

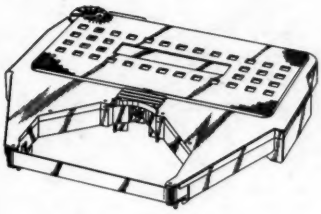


305,241
MICROFILM CAMERA WITH READER-PRINTER
Hiroshi Fukuda, and Masahiro Fukuda, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed May 14, 1986, Ser. No. 865,904
Term of patent 14 years
U.S. Cl. D16—223

305,242
PRINTING RIBBON CARTRIDGE
Mario Bellini, Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy
Filed Aug. 12, 1988, Ser. No. 231,464
Claims priority, application Italy, Feb. 22, 1988, 52912/88[U]
The portion of the term of this patent subsequent to Dec. 26, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D18—12



305,243
PRINTING RIBBON CARTRIDGE
Mario Bellini, Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy
Filed Aug. 12, 1988, Ser. No. 231,463
Claims priority, application Italy, Feb. 22, 1988, 52906/88[U]
The portion of the term of this patent subsequent to Dec. 26, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D18—12



305,244

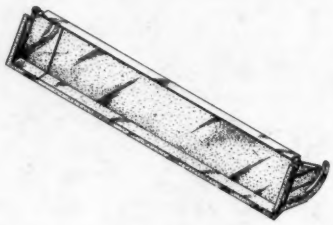
ACCESS DOOR FOR A COMPUTER PRINTER

Douglas E. Goodner, Charlotte; David V. Iorio, Harrisburg; Thomas E. Pangburn, Charlotte; Roy D. Stoyer, Concord, and Ronald K. Worth, Charlotte, all of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 30, 1986, Ser. No. 869,264

Term of patent 14 years

U.S. Cl. D18—18



305,245

CAP FOR WRITING TOOLS

C. H. Chuang, Taipei, Taiwan, assignor to Pioneer Industrial Corp., Taipei, Taiwan

Filed Mar. 27, 1987, Ser. No. 32,073

Term of patent 14 years

U.S. Cl. D19—57

305,246

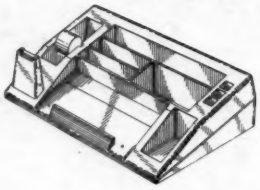
DESK ORGANIZER

Kenneth J. Kirchhoff, Gem Lake, and Bruce E. Nelson, St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 15, 1987, Ser. No. 3,691

Term of patent 14 years

U.S. Cl. D19—75



305,247

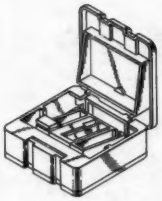
SIMULATIVE TOY BOX

Hiroshi Ukisu, Matsudo, Japan, assignor to Epoch Company, Ltd., Tokyo, Japan

Filed Dec. 11, 1987, Ser. No. 131,551

Term of patent 14 years

U.S. Cl. D21—59



305,248

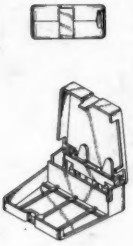
SIMULATIVE TOY PENCIL SHARPENER

Hiroshi Ukisu, Matsudo, Japan, assignor to Epoch Company, Ltd., Tokyo, Japan

Filed Dec. 11, 1987, Ser. No. 131,547

Term of patent 14 years

U.S. Cl. D21—59



305,249

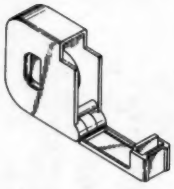
SIMULATIVE TOY TAPE DISPENSER

Hiroshi Ukisu, Matsudo, Japan, assignor to Epoch Company, Ltd., Tokyo, Japan

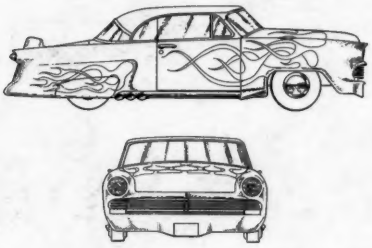
Filed Dec. 11, 1987, Ser. No. 132,058

Term of patent 14 years

U.S. Cl. D21—59

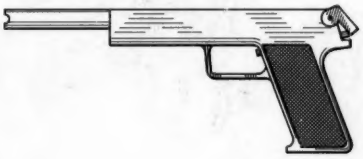


305,250
MODEL CAR
Peter Vendetti, R.D. #1, Ely Harmony Rd., Freehold, N.J. 07728
Filed Nov. 18, 1986, Ser. No. 930,557
Term of patent 14 years
U.S. Cl. D21—136



305,251
TOY RHINOCEROS OR THE LIKE
Robert F. Bateman, Greenville; Brian L. Newton, Woonsocket; Martin J. Wolff, North Providence, all of R.I.; John R. Nottingham, and John W. Spirk, both of Moreland Hills, Ohio, assignors to Dart Industries Inc., Deerfield, Ill.
Filed Jul. 16, 1986, Ser. No. 886,718
Term of patent 14 years
U.S. Cl. D21—148

305,252
RUBBER BAND GUN
Keith E. Nielson, and Bert Neilson, both of P.O. Box 362, Gunnison, Utah 84634
Filed Jul. 29, 1987, Ser. No. 79,274
Term of patent 14 years
U.S. Cl. D21—147

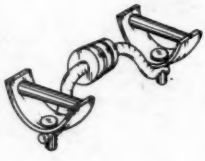


305,253
TOY ANIMAL
Robert B. Montgomery, Canterbury, England, assignor to Munnier Freres S.A., Damprichard, France
Filed Nov. 24, 1986, Ser. No. 934,135
Term of patent 14 years
U.S. Cl. D21—161

305,254
TOY ELEPHANT OR THE LIKE
Robert F. Bateman, Greenville; Brian L. Newton, Woonsocket; Martin J. Wolff, North Providence, all of R.I.; John R. Nottingham, and John W. Spirk, both of Moreland Hills, Ohio, assignors to Dart Industries Inc., Deerfield, Ill.
Filed Jul. 16, 1986, Ser. No. 886,716
Term of patent 14 years
U.S. Cl. D21—162

305,255
RECONFIGURABLE TOY TIGER
Takayuki Ishizawa, Souka, Japan, assignor to Takara Co., Ltd., Tokyo, Japan
Filed Dec. 15, 1986, Ser. No. 942,099
Claims priority, application Japan, Oct. 29, 1986, 61-42846
Term of patent 14 years
U.S. Cl. D21—163

305,256
TRICEP BAR
Bruce E. Pearson, 409 W. Woodruff, Apt. 1, Searcy, Ark. 72143
Filed Jul. 13, 1987, Ser. No. 72,578
Term of patent 14 years
U.S. Cl. D21—198

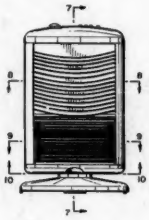


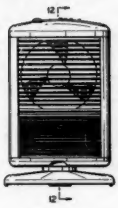
305,257
KNIFE
Roy B. Bendickson, and Robert A. Seaton, both of Wausau, Wis., assignors to Fiskars Oy Ab, Helsinki, Finland
Filed Nov. 7, 1986, Ser. No. 929,210
Term of patent 14 years
U.S. Cl. D22—118

305,258
LURE
Gary L. Bybee, Rte. 1, Box 73A, Jacksonville, Mo. 65260
Filed Jun. 12, 1987, Ser. No. 60,777
Term of patent 14 years
U.S. Cl. D22—132

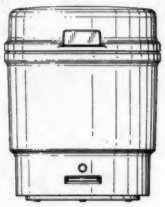
305,259
INDUSTRIAL CONTAINER
William J. Granberg, Mansfield; Richard A. Wagner, and Gary W. Hundt, both of Fort Worth, all of Tex., assignors to Essex Environmental Industries, Inc., Hurst, Tex.
Filed Feb. 19, 1987, Ser. No. 17,200
Term of patent 14 years
U.S. Cl. D23—205

305,260
ELECTRIC RADIANT HEATER
Yoshio Mito, Gifu, Japan, assignor to Toyotomi Kogyo Co., Ltd., Japan
Filed Nov. 25, 1987, Ser. No. 125,266
Claims priority, application Japan, May 29, 1987, 62-21925
Term of patent 14 years
U.S. Cl. D23—337



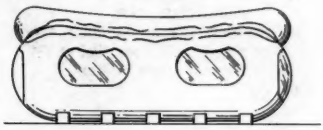


305,261
DISINFECTION UNIT
Michael A. Hobbs, Woodford Green, England, assignor to Avent Medical Limited, Hong Kong
Filed Apr. 24, 1987, Ser. No. 42,369
Claims priority, application United Kingdom, Oct. 27, 1986, 1037655
Term of patent 14 years
U.S. Cl. D24—9

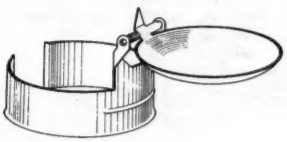


305,262
NASAL ASPIRATOR
Khipra Nichols, Rumford, R.I., assignor to Playschool Baby, Inc., Pawtucket, R.I.
Filed Aug. 3, 1987, Ser. No. 81,711
Term of patent 14 years
U.S. Cl. D24—60

305,263
RESTAURANT BUILDING
Nathan A. Dickerson, 608 S. 5th St., Nederland, Tex. 77627
Filed Oct. 29, 1987, Ser. No. 113,892
Term of patent 14 years
U.S. Cl. D25—10

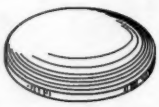


305,264
AUTOMATIC CANDLE SNUFFER
Per A. B. Bengtsson, P1 2483, S-686 02 Rottneros, and Leif Agren, Övre Bondestad, S-665 00 Kil, both of Sweden
Filed Mar. 13, 1987, Ser. No. 25,828
Claims priority, application Sweden, Sep. 15, 1986, 86-2103
Term of patent 14 years
U.S. Cl. D26—23



305,265
RAZOR HANDLE FOR USE WITH A CARTRIDGE
Vincent C. Motta, West Norwalk, Conn.; Hiromasa Yasui, Tokyo, and Yoshiaki Igarashi, Yokohama, both of Japan, assignors to Warner-Lambert Company, Morris Plains, N.J.
Filed Jun. 30, 1987, Ser. No. 68,583
Term of patent 14 years
U.S. Cl. D28—48

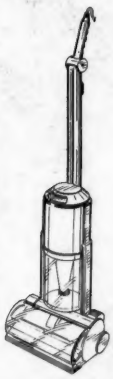
305,266
NAIL FILE
Richard L. Hirschauer, 1810 Court St., Sioux City, Iowa 51104
Filed Aug. 28, 1987, Ser. No. 91,071
Term of patent 14 years
U.S. Cl. D28—59

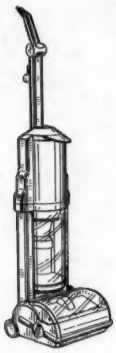


305,267
FINGERNAIL CLIPPER
Liaw S. Chung, 4 Floor, No. 18 Alley 21, Lane 323, Nei-Hu Road, Section 1, Taipei, Taiwan
Filed Feb. 25, 1986, Ser. No. 836,461
Term of patent 14 years
U.S. Cl. D28—60

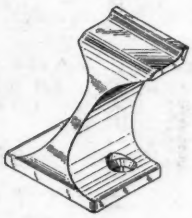
305,268
LIPSTICK CONTAINER
Chih-Ping Cheng, No. 37, Nan Yau Road, Changhua City, Taiwan
Filed Oct. 15, 1987, Ser. No. 110,050
Term of patent 14 years
U.S. Cl. D28—88

305,269
VACUUM CLEANER
James Dyson, Bathford, United Kingdom, assignor to Iona Appliances Inc./Appareils Inc., Welland, Canada
Filed Oct. 21, 1987, Ser. No. 110,957
Claims priority, application Canada, Apr. 21, 1987, 21-04-87-4
Term of patent 14 years
U.S. Cl. D32—22

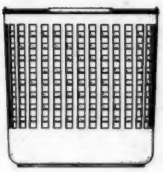




305,270
SKI BOOT SCRAPER
Pamela J. Swanson, and John W. Swanson, both of 3023 Lakewood Dr., Maplewood, Minn. 55109
Filed Feb. 2, 1987, Ser. No. 10,173
Term of patent 14 years
U.S. Cl. D32—47

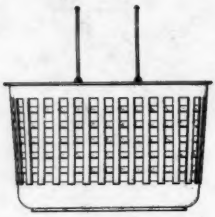


305,271
BASKET
Toshimichi Yoshikawa, Nara, Japan, assignor to Kabushiki Kaisha Yoshikawa Kuni Kogyosho, Nara, Japan
Filed Jul. 9, 1986, Ser. No. 883,838
Claims priority, application Japan, Jan. 13, 1986, 61-797
The portion of the term of this patent subsequent to Dec. 19, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D34—40

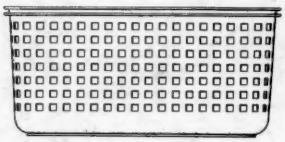


305,272
SHELF MOUNTED STORAGE BASKET
Lee Remmers, Ocala, Fla., assignor to Clairson International, Ocala, Fla.
Filed Feb. 12, 1987, Ser. No. 13,864
Term of patent 14 years
U.S. Cl. D34—42

305,273
BASKET
Toshimichi Yoshikawa, Nara, Japan, assignor to Kabushiki Kaisha Yoshikawa Kuni Kogyosho, Nara, Japan
Filed Jun. 16, 1986, Ser. No. 875,373
Term of patent 14 years
U.S. Cl. D34—42



305,274
BASKET
Toshimichi Yoshikawa, Nara, Japan, assignor to Kabushiki Kaisha Yoshikawa Kuni Kogyosho, Nara, Japan
Filed Apr. 22, 1986, Ser. No. 857,445
Claims priority, application Japan, Nov. 15, 1985, 60-48070
Term of patent 14 years
U.S. Cl. D34—40



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 26TH DAY OF DECEMBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. B. Dick Company: *See—*
Eremity, Frank; and Arway, George, 4,890,119, Cl. 346-75.000.

A. Monforts GmbH & Co.: *See—*
Metzen, Heinz, 4,888,860, Cl. 26-18.600.

A/S Ferrosan: *See—*
Jacobsen, Poul; Nielsen, Flemming E.; and Honore, Tage, 4,889,855, Cl. 514-250.000.

A/S Niro Atomizer: *See—*
Moller, Jens T.; Jacobsen, Niels; Nielsen, Kirsten K.; and Rasmussen, Stig, 4,889,698, Cl. 423-210.000.

AB Tetra Pak: *See—*
Bergstrom, Anders, 4,889,223, Cl. 198-364.000.

AB Tore J Hedback: *See—*
Engelbertsson, Karl-Magnus, 4,889,163, Cl. 137-625.320.

Ab Volvo: *See—*
Janiszewski, Gzegorz; Sahlmen, Thomas; and Nystrom, Mats, 4,889,217, Cl. 192-48.910.

Abbott Laboratories: *See—*
Geist, Jill M.; Messner Scott C.; and Schapira, Thomas G., 4,889,612, Cl. 204-416.000.

Abe, Yasunao, to Yamaha Corporation. Sequencer unit of electronic musical instrument. 4,889,026, Cl. 84-611.000.

Aberdeen University: *See—*
Watmough, David; and Chan, Kwok K., 4,889,122, Cl. 128-399.000.

Abraham, John: *See—*
Berkowitz, Murray; and Abraham, John, 4,889,091, Cl. 123-219.000.

Abraham, William F., to Brunswick Valve & Control, Inc. Anti-lockup drive mechanism for a position controlled linear actuator. 4,889,002, Cl. 74-89.150.

Accurate Products Co.: *See—*
Buehning, Peter G., 4,889,476, Cl. 425-72.200.

Acheson Industries, Inc.: *See—*
Wiley, Robert E., 4,889,750, Cl. 428-34.200.

Adamantech, Inc.: *See—*
Yuhas, John M.; Goodman, Robert L.; and Moore, Robert E., 4,889,525, Cl. 600-1.000.

Adams, Brian; and Cunningham, Linda, to Gallagher Limited. Smoking rod wrapper and compositions for their production. 4,889,145, Cl. 131-365.000.

Adams, Gerald A. Fishing lure. 4,888,909, Cl. 43-42.160.

Adams, Samuel F.; and Bolz, Hans-Peter, to Sonoco Products Company. Yarn carrier with interchangeable identifying ring. 4,889,294, Cl. 242-118.300.

Adaniya, Takeshi; Yamashita, Masaaki; Kubota, Takahiro; Enatsu, Akira; Nikaido, Norio; Miyosawa, Yoshiaki; and Nishimoto, Tadashi, to Nippon Kokan Kabushiki Kaisha; and Kansai Paint Co., Ltd. Highly corrosion-resistant surface-treated steel plate. 4,889,775, Cl. 428-62.00B.

Adeka Argus Chemical Co., Ltd.: *See—*
Akutsu, Mitsuo; and Tabata, Keiji, 4,889,672, Cl. 264-63.000.

Adolph Coors Company: *See—*
Dugan, Larry M., 4,889,243, Cl. 209-626.000.

Advanced Micro Devices: *See—*
Chuang, Patrick T.; Yau, Robert L.; Yoshida, Hiroshi; and Wang, Moon-Yee, 4,890,260, Cl. 365-49.000.

Advanced Micro Devices, Inc.: *See—*
Annamalai, Kadiresan, 4,890,304, Cl. 375-114.000.

Aeroquip Corporation: *See—*
Laipply, Robert A., 4,889,368, Cl. 285-18.000.

Affald International Inc.: *See—*
Koffsky, Robert M.; and Pedersen, Finn S., 4,889,290, Cl. 241-36.000.

Afflito, John: *See—*
Gaffar, Abdul; Lau, Shek-Hong H.; Afflito, John; and Nykvist, Arline M., 4,889,712, Cl. 424-52.000.

Agency of Industrial Science and Technology: *See—*
Nagawa, Yoshinobu; Honda, Koichi; and Nakanishi, Hiroshi, 4,889,937, Cl. 548-420.000.

Agency of Industrial Science Technology, Ministry of International Trade & Industry: *See—*
Tanihara, Masao; Oka, Kiichiro; Yamada, Hideaki; Kobayashi, Akira; Nakashima, Toshihide; Omura, Yoshiaki; and Takakura, Koichi, 4,889,917, Cl. 530-324.000.

Aguilar, Gerardo: *See—*
Alcaraz, Alfonso; Aguilar, Gerardo; Gonzalez, Mauricio; and Elizarraraz, Antonio, 4,889,210, Cl. 186-38.000.

Ahmed, Fahim U.; and Buck, Charles E., to Colgate-Palmolive Company. Thixotropic aqueous liquid automatic dishwashing detergent composition containing anti-spotting and anti-filming agents. 4,889,653, Cl. 252-99.000.

Ahmed, Syed M., to Siemens Aktiengesellschaft. Open-loop current amplifiers having improved gain characteristics. 4,890,068, Cl. 330-253.000.

AIL Corporation: *See—*
Bostwick, Norvan W., 4,889,092, Cl. 123-381.000.

Aisin Aw Co., Ltd.: *See—*
Yamada, Yoshihiro; Shirai, Ryoichi; and Hayakawa, Youichi, 4,889,621, Cl. 210-168.000.

Aisin-Warner Kabushiki Kaisha: *See—*
Kuwayama, Yoshinari; Yokoyama, Fumitomo; and Miura, Masakatsu, 4,889,016, Cl. 74-868.000.

Akasaki, Yutaka; Tokita, Akihiko; Torikoshi, Kaoru; Imai, Akira; and Ishii, Touru, to Fuji Xerox Co., Ltd. Bisazo compounds. 4,889,924, Cl. 534-658.000.

Akebono Brake Industry Co., Ltd.: *See—*
Fujita, Tomohiro; and Kawano, Ryuji, 4,889,395, Cl. 303-115.000.

Akiyama, Akihiko: *See—*
Tabata, Hiroshi; and Akiyama, Akihiko, 4,889,068, Cl. 116-203.000.

Akiyama, Hiroyuki; Izawa, Susumu; Kuwabara, Hideki; and Yamaguchi, Toru, to Japan Styrene Paper Corporation. Production method of prefoamed particles of polyolefin resin. 4,889,671, Cl. 264-53.000.

Akuto, Keiji, to Nippon Telegraph and Telephone Corporation. Secondary battery and method of manufacturing the same. 4,889,777, Cl. 429-162.000.

Akutsu, Mitsuo; and Tabata, Keiji, to Adeka Argus Chemical Co., Ltd. Process for producing ceramic molding. 4,889,672, Cl. 264-63.000.

Albizzati, Enrico: *See—*
Canova, Luciano; Giannini, Umberto; Albizzati, Enrico; Borghi, Italo; and Proto, Antonio, 4,889,896, Cl. 525-375.000.

Albrecht, David E. Adapter fitting. 4,889,369, Cl. 285-39.000.

Alcan International Limited: *See—*
Rigby, William R.; Furneaux, Robin C.; and Thomas, Anthony T., 4,889,631, Cl. 210-493.100.

Alcaraz, Alfonso; Aguilar, Gerardo; Gonzalez, Mauricio; and Elizarraraz, Antonio, to Cofusa Enterprises, Inc. Robotic product server and system. 4,889,210, Cl. 186-38.000.

Alfa Lancia Industriale S.p.A.: *See—*
Scapecchi, Pier L.; Coghi, Giovanni; and Lanati, Paolo, 4,889,086, Cl. 123-90.150.

Aligena, AG: *See—*
Perry, Mordechai; Kotraro, Reuven; Linder, Charles; and Aviv, Gershon, 4,889,636, Cl. 210-651.000.

Allied-Signal Inc.: *See—*
Datta, Amitava; Davis, Lance A.; DeCristofaro, Nicholas J.; and Marti, Jordi, 4,889,568, Cl. 148-108.000.
Hou, Janpu; Chai, Bruce H.; Badding, David D.; West, Gary A.; and Marcus, Stephen L., 4,889,993, Cl. 250-365.000.

Allison, James R.; and Bolin, Garry J., to Schlage Lock Company. Solar powered proximity triggered light. 4,890,093, Cl. 340-567.000.

Allpak Container, Inc.: *See—*
Rockom, John W.; and Collier, Charles A., 4,889,252, Cl. 220-3.100.

Allsop, Bryan E.; Mabbitt, Allen W.; and Smith, Kevin K., to Tektronix, Inc. Combined optical power meter and receiver. 4,889,985, Cl. 250-214.00A.

Alltech Services, Incorporated: *See—*
Rosenfield, Ronald H., 4,889,044, Cl. 99-510.000.

Almex Control Systems Limited: *See—*
Schofield, Paul; and Sewell, Graham P., 4,889,437, Cl. 400-73.000.

Alon, Gad: *See—*
Yescheskel, Herzel B.; Alon, Gad; and Beck, Elieze , 4,888,856, Cl. 19-0.270.

Alpha Enterprises, Inc.: *See—*
Hehn, Bruce A.; and Sankey, James K., 4,889,244, Cl. 211-41.000.

Alpha Mail System: *See—*
Ryan, Patrick J., 4,889,397, Cl. 312-320.000.

Alta Diagnostic Machines Limited: *See—*
Bradwell, Arthur R.; and Deverill, Ian, 4,889,815, Cl. 436-517.000.

Althouse, Rickie M.; Baer, Richard I.; and Brandt, Ronald L. Connector having drop-in insert conductive with shell. 4,889,502, Cl. 439-607.000.

Aluminum Company of America: *See—*
Bush, J. Finley, 4,889,695, Cl. 423-132.000.

Alvado, Joseph D.: *See—*
Temple, Roger C., 4,889,212, Cl. 188-112.00R.

Amada Company, Limited: *See—*
Miyama, Hidetoshi; Sugimoto, Masanori; and Kawaguchi, Kouji, 4,889,968, Cl. 219-121.700.

Amano, Fumio: *See—*
Taniguchi, Tomohiko; Iseda, Kohei; Okazaki, Koji; Amano, Fumio; and Unagami, Shigeyuki, 4,890,325, Cl. 381-34.000.

Amano, Yoshikazu; Kageyama, Shigeki; and Katsuyama, Harumi, to Fuji Photo Film Co., Ltd. Dry analytical element having a spread control area for assaying enzyme activity. 4,889,797, Cl. 435-4.000.

Amberg, Guenther; Bechstedt, Wolfgang; Schulz, Paul; and Trabitzsch, Uwe, to Henkel Kommanditgesellschaft auf Aktien. Machine washing process: detergent paste and automatic dispenser. 4,889,644, Cl. 252-8.900.

Amdahl Cororation: *See*—
Sochor, Jerzy, 4,889,499, Cl. 439-268.000.

American Cyanamid Company: *See*—
Ritter, Lawrence; and Lawter, James R., 4,889,845, Cl. 514-63.000.

American Health Products, Inc.: *See*—
Salem, Robert J.; and Holley, George H., 4,889,131, Cl. 128-671.000.

American Home Products: *See*—
Rappaport, Ruth, 4,889,808, Cl. 435-240.100.

American Home Products Corporation: *See*—
Musser, John H., 4,889,935, Cl. 546-176.000.

American & Overseas Corporation: *See*—
Tamblyn, Charles C.; and Forde, Philip L., 4,889,381, Cl. 296-98.000.

American Seating Company: *See*—
Chadwick, Donald T.; and Glass, Peter R., 4,889,385, Cl. 297-302.000.

American Standard Inc.: *See*—
Bergmann, Konrad, 4,889,157, Cl. 137-454.500.

American Telephone and Telegraph Company, 02: *See*—
Stohs, Norbert E., 4,890,271, Cl. 369-24.000.

American Telephone and Telegraph Company: *See*—
Prezas, Dimitrios P.; and Thomson, David L., 4,890,328, Cl. 381-38.000.
Russell, Thomas L., Jr., 4,890,322, Cl. 380-20.000.

American Telephone and Telegraph Company, AT&T Bell Laboratories: *See*—
Reinhart, Franz K., 4,889,402, Cl. 350-96.140.

Amersham International plc: *See*—
Dyson, Nicholas J.; Pashby, David P.; and Parke, Judith M., 4,889,606, Cl. 204-182.800.

Amjad, Zahid; and Masler, William F. Scale control with terpolymers containing vinyl alcohol. 4,889,637, Cl. 210-701.000.

Amoco Corporation: *See*—
Connolly, John F.; and Thrash, Robert J., 4,889,779, Cl. 429-196.000.
Crosby, Robert A., 4,890,296, Cl. 372-107.000.
Vettel, Paula R., 4,889,646, Cl. 252-32.70E.

Amos, Michael D.: *See*—
Brosnan, Denis A.; Whetsel, James E.; Singer, Richard E.; Samas, Mark V.; Amos, Michael D.; and Kovarik, David P., 4,889,324, Cl. 266-157.000.

AMP Incorporated: *See*—
Maack, Werner; Gerst, Michael; and Liedloff, Manfred, 4,888,867, Cl. 29-857.000.

Amphenol Corporation: *See*—
Riches, Arthur J., 4,889,497, Cl. 439-76.000.

Amundson, Donald E.; Hamaker, Jon B.; Pecht, Glenn G.; and Sedy, Josef, to John Crane-Houdaille, Inc. Spiral groove seal system for high vapor-pressure liquids. 4,889,348, Cl. 277-1.000.

Anderson, Erik H.: *See*—
Smith, Henry I.; Anderson, Erik H.; and Schattenburg, Mark L., 4,890,309, Cl. 378-35.000.

Anderson, James H.: *See*—
Farkas, Richard W.; Rock, David A.; and Anderson, James H., 4,889,975, Cl. 219-548.000.

Anderson, Jeffrey J.: *See*—
Titterington, Donald R.; Anderson, Jeffrey J.; Rise, James D.; and Jaeger, Wayne, 4,889,761, Cl. 428-195.000.

Anderson, Johnny J.: *See*—
Snyder, David A.; and Anderson, Johnny J., 4,889,679, Cl. 376-258.000.

Anderson, Paul C. Further improved overhead sheet-installation support tool. 4,889,459, Cl. 411-400.000.

Anderson, Willard H. Horseshoe. 4,889,188, Cl. 168-13.000.

Andersson, Birgitta S.; Zethraeus, Malin C.; Herngren, Torbjorn; and Gustafsson, Jan-Erik V., to STFI. Process and apparatus for control in burning and slaking of lime and causticizing. 4,889,592, Cl. 162-29.000.

Ando, Hideo, to Kabushiki Kaisha Toshiba. Apparatus for correcting photodetector signals in a system for retrieving information from an optical recording medium. 4,890,272, Cl. 369-45.000.

Ando, Hitoshi; Kashiwazaki, Takashi; Hosoi, Masayuki; and Fukushima, Atsuhiko, to Pioneer Electronic Corporation. Vehicle bearing detection and data processing methods applicable to vehicle navigation system. 4,890,233, Cl. 364-457.000.

Andrews, Christopher J., to Racal Communications Equipment Limited. Radio transmitters. 4,890,300, Cl. 375-60.000.

Andrzejewski, Thomas: *See*—
Enderle, Eckhard; Kaufmann, Dieter; Muller; and Andrzejewski, Thomas, 4,888,877, Cl. 33-559.000.

Anglin, Willie R., to Outboard Marine Corporation. Molding apparatus with improved ejector pin. 4,889,311, Cl. 249-68.000.

Annamalai, Kadiresan, to Advanced Micro Devices, Inc. Reliable recovery of data in encoder/decoder. 4,890,304, Cl. 375-114.000.

Anne, Roland, to Gaz de France. Guidance and protection system for the laying of pipes. 4,889,450, Cl. 405-154.000.

Anritsu Corporation: *See*—
Takano, Mitsuyoshi, 4,890,099, Cl. 340-724.000.

Anstey, Henry D.: *See*—
Ardueser, William A.; and Anstey, Henry D., 4,889,047, Cl. 100-87.000.

Anthias, Tefcros; Herrod, John A.; and Trees, George M., to International Business Machines Corporation. Multiple window display system having indirectly addressable windows arranged in an ordered list. 4,890,257, Cl. 364-900.000.

Antoine, Dominique: *See*—
Hantz, Dominique; Antoine, Dominique; and Jackowski, Bruno, 4,889,042, Cl. 99-340.000.

Aoki, Nobuo: *See*—
Tsuchiya, Shozo; Aoki, Nobuo; and Suzuki, Shinichiro, 4,889,791, Cl. 430-270.000.

Aoki, Shigeru: *See*—
Inuzuka, Toshio; Hasegawa, Tsutomu; Tomikawa, Minato; and Aoki, Shigeru, 4,889,766, Cl. 428-324.000.

Aoki, Takatoshi: *See*—
Yagi, Toru; Fujiyoshi, Yoshihiro; Aoki, Takatoshi; and Urata, Yasuhiro, 4,889,085, Cl. 123-90.120.

Aoyama, Noboru: *See*—
Ono, Takuro; Aoyama, Noboru; and Morinaga, Kaoru, 4,890,276, Cl. 369-77.200.

Appeldorn, Alfred: *See*—
Hadeler, Dieter; and Appeldorn, Alfred, 4,890,025, Cl. 310-68.00C.

Applied Power Inc.: *See*—
Janecke, James P., 4,889,161, Cl. 137-596.000.

Apsley Metals Limited: *See*—
Mathews, Derek, 4,889,173, Cl. 152-528.000.

APV Magnetronics Limited: *See*—
Meredith, Roger J., 4,889,966, Cl. 219-10.55F.

Arai, Masaru: *See*—
Hozumi, Kazuhiro; Arai, Masaru; and Saito, Yoshitane, 4,889,164, Cl. 137-625.640.

Arai, Nobushige, to Sharp Kabushiki Kaisha. Selective absorption film of a solar heat collector. 4,889,601, Cl. 204-37.100.

Arai, Norikazu, to Konishiroku Photo Industry Co., Ltd. Projection lens for television projector. 4,889,417, Cl. 350-432.000.

Arai, Yutaka: *See*—
Shimizu, Isoo; Matsumura, Yasuo; and Arai, Yutaka, 4,889,952, Cl. 562-460.000.

Arakawa, Yoshiaki: *See*—
Naitoh, Kazumi; Arakawa, Yoshiaki; Ikezaki, Takashi; Yabe, Shoji; Yokoyama, Yutaka; Hamaguchi, Yuichi; Roppongi, Yasunobu; and Hamaguchi, Yuichi, 4,889,536, Cl. 29-570.100.

Araki, Fujio: *See*—
Kobayashi, Hisataka; Araki, Fujio; and Ohtani, Yoshihiro, 4,890,057, Cl. 324-140.00D.

Araki, Kazuhiko; Kuroda, Tsuyoshi; Uemori, Satoru; Moriguchi, Akihiko; and Ikeda, Yoshifumi, to Yoshitomi Pharmaceutical Industries, Ltd. Quinolonecarboxylic acid compounds and pharmaceutical use thereof. 4,889,857, Cl. 514-235.200.

Araki, Masakatsu: *See*—
Fujikawa, Shouji; Araki, Masakatsu; Kumano, Fumihiro; and Tsujimura, Shinichirou, 4,888,870, Cl. 30-233.500.

ARCH Development Corporation: *See*—
Gruen, Dieter M.; Young, Charles E.; and Pellin, Michael J., 4,889,987, Cl. 250-282.000.

Arcus, Christopher G., to IXYS Corporation. Circuit for sensing voltages beyond the supply voltage of the sensing circuit. 4,890,013, Cl. 307-355.000.

Ardueser, William A.; and Anstey, Henry D., to Deere & Company. Bale push bar. 4,889,047, Cl. 100-87.000.

Argentieri, Thomas M., to Argentieri, Thomas Michael. Modular tissue superfusion chamber. 4,889,691, Cl. 422-102.000.

Argentieri, Thomas Michael: *See*—
Argentieri, Thomas M., 4,889,691, Cl. 422-102.000.

Aristacom International, Inc.: *See*—
Cooley, Bradford S., 4,890,254, Cl. 364-900.000.

Armitage Shanks Limited: *See*—
Newcombe, Haydn J.; and Hird, John, 4,889,162, Cl. 137-606.000.
Newcombe, Haydn J.; and Hird, John, 4,889,165, Cl. 137-801.000.

Arndt, Friedrich: *See*—
Rowson, Graham P.; Head, John C.; Westermann, Jurgen; Kruger, Martin; Arndt, Friedrich; and Rees, Richard, 4,889,553, Cl. 71-92.000.

Artz, Klaus: *See*—
Hefti, Heinz; Artz, Klaus; Weber, Kurt; Burdeska, Kurt; and Reinehr, Dieter, 4,889,655, Cl. 252-301.220.

Artz, Steven P., to Du Pont de Nemours, E. I., and Company. Herbicidal sulfonamides. 4,889,550, Cl. 71-86.000.

Arway, George: *See*—
Eremity, Frank; and Arway, George, 4,890,119, Cl. 346-75.000.

Asada, Masayuki: *See*—
Nakamura, Seishiro; Oukami, Katutoshi; and Asada, Masayuki, 4,889,833, Cl. 501-1.000.

Asahi Denka Kogyo Kabushiki Kaisha: *See*—
Ogou, Sunoo; Ishii, Shigemichi; Tagomori, Sadaaki; Fukushima, Takuo; and Hayashida, Yasumasa, 4,889,312, Cl. 249-216.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Teshima, Shinichi, 4,889,408, Cl. 350-96.340.

Asahi Kogaku Kogyo K.K.: *See*—
Negoro, Ikuo; and Kita, Masahiro, 4,890,140, Cl. 355-290.000.
Ogawa, Ryota; Toji, Shigeo; Yoshida, Kazushi; and Okura, Zenichi, 4,890,133, Cl. 354-402.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Hama, Yoshihiro, 4,890,132, Cl. 354-400.000.

Asakura, Sotoo: *See—*
Ueda, Yoshio; Asakura, Sotoo; Murakami, Yoshio; and Nakate, Toshiomi, 4,889,721, Cl. 424-448.000.

Asakura, Tsutou: *See—*
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 4,890,124, Cl. 346-160.000.

Asano, Seiji: *See—*
Takei, Hisashi; Ohmura, Hiroshi; Ushiro, Seimei; Mochida, Mitsuyoshi; Nakamura, Yoshihiko; Asano, Seiji; and Yoshida, Toshio, 4,890,130, Cl. 354-288.000.

Asano, takateru: *See—*
Kaifu, Katsuaki; Kosuge, Maki; Yamashita, Yoshio; Asano, takateru; and Kobayashi, Kenji, 4,889,795, Cl. 430-326.000.

ASC Machine Tools, Inc.: *See—*
Frost, Terry; Smith, Terry B.; and Vensel, Charles D., 4,889,463, Cl. 414-416.000.

Asea Aktiebolag: *See—*
Persson, Tage, 4,890,028, Cl. 310-261.000.

Asea Brown Boveri AB: *See—*
Paulsson, Lars, 4,890,180, Cl. 361-16.000.

Ashton, Douglas W. Sole protectors for shoes. 4,888,888, Cl. 36-43.000.

Asleson, Allan E. Storage device for sheets of sandpaper. 4,889,232, Cl. 206-449.000.

Asmundsson, Oli J.: *See—*
Guomundsson, Edgar; and Asmundsson, Oli J., 4,888,933, Cl. 52-779.000.

Asmus, John F.; and Lovberg, Ralph H., to University of California, The Regents of the. Plasma pinch system. 4,889,605, Cl. 204-157.440.

Aso, Seiichi, to Mazda Motor Corporation. Arrangement for supporting and adjusting seats in vehicles. 4,889,379, Cl. 296-65.100.

Associated Universities, Inc.: *See—*
Sugama, Toshifumi, 4,889,718, Cl. 428-343.000.

Astra Lakemedel Aktiebolag: *See—*
Vaya, Jacob; Ladkani, David; Schoenberger, Clara; Kaspi, Joseph; Salemnick, Gad; Yellin, Haim; and Cherkez, Stephan, 4,889,929, Cl. 540-318.000.

AT&T Bell Laboratories: *See—*
Prezas, Dimitrios P.; and Thomson, David L., 4,890,328, Cl. 381-38.000.
Russell, Thomas L., Jr., 4,890,322, Cl. 380-20.000.

AT & T Laboratories: *See—*
Stohs, Norbert E., 4,890,271, Cl. 369-24.000.

Atcheson, Paul D., to Ball Corporation. Hemispherical retroreflector. 4,889,409, Cl. 350-104.000.

Atlantic Richfield Company: *See—*
Crews, Gary A.; and Martinez, David R., 4,890,264, Cl. 367-45.000.

Atochem: *See—*
Bordere, Serge; Pagniez, Guy; and Potin, Philippe, 4,889,910, Cl. 528-168.000.

Atsugi Motor Parts Company, Limited: *See—*
Hashizume, Yoshikazu; and Kamiya, Haruo, 4,889,314, Cl. 251-129.020.

Auding, Hans; Frank, Gunter; Kostlin, Heiner; and Vitt, Bruno, to U.S. Philips Corporation. Thin-film heating element. 4,889,974, Cl. 219-543.000.

Auer, Robert T.; Keats, Richard L.; and Chung, Jore M., to Buddy L Corp. Blinking toy vehicle. 4,889,514, Cl. 446-230.000.

Auer, Robert T.; and Reina, David, to Buddy L Corporation. Four-wheel drive toy and truck assembly. 4,889,515, Cl. 446-428.000.

Auer, Robert T.; and Reina, David, to Buddy L Corp. Plug-in module for motorized toy vehicle. 4,889,516, Cl. 446-462.000.

Auerbach, David R., to Pitney Bowes Inc. Envelope throat opening blade. 4,888,938, Cl. 53-569.000.

Auinger, Herbert, to Siemens Aktiengesellschaft. Circuit and winding arrangement for a multiphase electric rotating field machine. 4,890,049, Cl. 318-771.000.

Aujourd'hui, Rene F. Coated edible article with holding member to prevent finger soiling. 4,889,729, Cl. 426-94.000.

Aurelle, Yves; Bernasconi, Christian; Besombes-Vailhe, Jean; Julien, Edmond; and Roques, Henri, to ELF FRANCE Societe Anonyme. Method for treating a fuel comprising a mixture of hydrocarbons and alcohols, and a selective water-adsorption product. 4,889,537, Cl. 44-53.000.

Aurik, Erik A.: *See—*
Verbrugge, Jeroen K. J.; and Aurik, Erik A., 4,889,074, Cl. 119-14.030.

Ausschnitt, Christopher P.; McFadden, Edward A.; and Tan, Raul V., to Shipley Company, Inc. Lithographic process analysis and control system. 4,890,239, Cl. 364-491.000.

Aust, Aloys; Tiroux, Josef; and Weissenfels, Franz, to Dynamit Nobel AG; and Isobloc GmbH. Phenolic resin foams of high filler content and their use as insulation. 4,889,875, Cl. 521-123.000.

Autosplice, Inc.: *See—*
Zahn, Irwin, 4,889,277, Cl. 228-180.200.

Avery International Corporation: *See—*
Sorensen, Terry J.; and Wyss, Bill W., 4,889,234, Cl. 206-459.000.

Aviv, Gershon: *See—*
Perry, Mordechai; Kotraro, Reuven; Linder, Charles; and Aviv, Gershon, 4,889,636, Cl. 210-651.000.

Awaya, Juichi: *See—*
Sawai, Kiichi; Kurono, Masayasu; Awaya, Juichi; Kojima, Akio; and Ninomiya, Hideaki, 4,889,715, Cl. 424-80.000.

Axon, Fredrick J.: *See—*
Roos, Leo; Axon, Fredrick J.; and Briguglio, James J., 4,889,790, Cl. 439-258.000.

Axter, Sven E.: *See—*
Graham, Wesley H.; Axter, Sven E.; and Lin, Fu-Shiong, 4,889,569, Cl. 148-130.000.

Azvedo, Frank D. Aircraft theft guard. 4,888,968, Cl. 70-163.000.

B. Braun Melsungen AG: *See—*
Haindl, Hans, 4,889,529, Cl. 604-274.000.

B. V. Optische Industrie "De Oude Delft" : *See—*
Duinker, Simon, 4,890,312, Cl. 378-146.000.

Babcock-Hitachi Kabushiki Kaisha: *See—*
Fukayama, Yukio; Oshima, Taku; and Kawano, Shigeyoshi, 4,888,953, Cl. 60-657.000.

Backus, Petrus A. M., to Backus Sormac B.V. Apparatus for pelling bulbous plants. 4,889,045, Cl. 99-546.000.

Backus Sormac B.V.: *See—*
Backus, Petrus A. M., 4,889,045, Cl. 99-546.000.

Badding, David D.: *See—*
Hou, Janpu; Chai, Bruce H.; Badding, David D.; West, Gary A.; and Marcus, Stephen L., 4,889,993, Cl. 250-365.000.

Bader, Edgar, to U.S. Philips Corporation. Method and circuit for synchronizing a digital data transmission system with a network-external clock. 4,890,303, Cl. 375-107.000.

Baer, John S.; and Vietti, Michael A., to RainWise, Inc. Rotational position indicator. 4,888,986, Cl. 73-188.000.

Baer, Richard I.: *See—*
Althouse, Rickie M.; Baer, Richard I.; and Brandt, Ronald L., 4,889,502, Cl. 439-607.000.

Baggio, Dino; and Boscolo, Antonio, to Zeltron - Instituto Zanussi per la Ricerca S.p.A. Device for inspecting the heat insulation of household appliances, more particularly refrigerators. 4,890,244, Cl. 364-551.010.

Baghdachi, Jamil, to BASF Corporation. Fast-cure polyurethane sealant composition containing titanium ester accelerators. 4,889,903, Cl. 528-17.000.

Bagshaw, Stanley R.: *See—*
Rea, Philip L.; and Bagshaw, Stanley R., 4,888,928, Cl. 52-387.000.

Bailey, F. Pat: *See—*
Soward, Milton W.; and Bailey, F. Pat, 4,888,975, Cl. 72-392.000.

Baker, Daniel G.; Cooper, William J.; and Penney, Bruce J., to Tektronix, Inc. Recursive noise reduction filter for video test apparatus. 4,890,158, Cl. 358-10.000.

Baker, David R. Open end ratchet type wrench. 4,889,020, Cl. 81-119.000.

Baker, James W. Magnetic tape backup device for use with a floppy disk drive. 4,890,179, Cl. 360-132.000.

Baker, Robert E.: *See—*
Menown, Hugh; Baker, Robert E.; and Cullum, Leonard R., 4,890,034, Cl. 313-595.000.

Balboni, Gian P.; Giandonato, Giuseppe; Melen, Riccardo; and Vercellone, Vinicio, to Cselt - Centro Studi E Laboratori Telecomunicazioni S.P.A. Switching element for self-routing multistage packet-switching interconnection networks. 4,890,281, Cl. 370-60.000.

Baldwin, John J.: *See—*
Tolman, Richard L.; Wagner, Arthur F.; Baldwin, John J.; and Pietruszkiewicz, Adolph, 4,889,856, Cl. 514-254.000.

Bales, Robert W.; and Olson, Lynn T., to Tektronix, Inc. Method and apparatus for signal processing. 4,890,237, Cl. 364-485.000.

Baliga, Bantval J.; and Korman, Charles S., to General Electric Company. Protective clamp for MOS gated devices. 4,890,143, Cl. 357-23.400.

Ball Corporation: *See—*
Atcheson, Paul D., 4,889,409, Cl. 350-104.000.

Ballyns, Jan. Pressure alarm system for motor vehicle tires. 4,890,090, Cl. 340-442.000.

Balogh, Karoly; Dombay, Zsolt; Fodor, Karoly; Grega nee Toth, Erzebet; Lorik, Erno ; Magyar nee Tomorkenyi, Magdolna; Nagy, Jozsef; Pasztor, Karoly; Santha, Pal; Tarpai, Gyula; Toth, Istvan; and Urszin nee Simon, Eszter, to Eszakmagyarorszagi Vegyimuvek. Novel N-alkyl or N-alkenyl-N-(O,O-disubstituted-thio-phosphoryl)-N',N'-disubstituted glycin amides, process for the preparation thereof and acaricide, insecticide and fungicide containing these compounds as active ingredient. 4,889,944, Cl. 558-171.000.

Balzers Aktiengesellschaft: *See—*
Bergmann, Erich; and Braus, Jurgen, 4,889,772, Cl. 428-547.000.
Kunz, Anton, 4,889,494, Cl. 439-13.000.

Band, Gerhard; and Broghammer, Heinz, to Mauser-Werke Oberndork GmbH. Coordinate measuring machine. 4,889,519, Cl. 474-101.000.

Bando Chemical Industries, Ltd.: *See—*
Kobata, Tomokazu; and Matsui, Yosuke, 4,889,785, Cl. 430-59.000.

Bando, Keiji: *See—*
Jindai, Hideo; Bando, Keiji; Yoshida, Masakazu; and Yamada, Hideki, 4,889,466, Cl. 414-694.000.

Banjo, Toshinobu; Murasawa, Yasuhiro; and Onoda, Shigeo, to Mitsubishi Denki Kabushiki Kaisha. Memory card housing. 4,890,197, Cl. 361-392.000.

Banyasz, Joseph L.; Burton, Aubrey T.; LaRoy, Bernard C.; and Lowitz, David A., to Philip Morris Incorporated. Method and apparatus for detecting a missing object in a set of objects. 4,890,053, Cl. 324-58.50A.

Barbier, Rene ; and Guenin, Serge, to La Telemecanique Electrique. Electric coupling device, a circuit-breaker equipped therewith and a related assembly of components. 4,889,504, Cl. 439-712.000.

Barden, John M.; and Leung, Howard K. H., to Motorola, Inc. High capacitance trench capacitor and well extension process. 4,889,492, Cl. 437-15.000.

Barlage, Bruno; and Robert, Franz-Josef, to H. Niemeyer Sohne GmbH & Co. KG. Soil working machine. 4,889,190, Cl. 172-49.500.

Barson Corporation: *See—*
Priceman, Seymour, 4,889,776, Cl. 428-629.000.

Bartell, Ralph; Boissonneault, Roger; and Blischok, Monica, to Warner-Lambert Company. Credit card-style medication package. 4,889,236, Cl. 206-531.000.

Bartling, Werner; and Jagode, Fritz H., to Bison-Werke Baehre; and Greten GmbH & Co. KG. Method and plant for cleaning dryer exhaust gases during the drying of wood chips, wood fiber of the like. 4,888,884, Cl. 34-32.000.

Barzynski, Helmut; Benthack-Thomas, Heidi; Hellwig, Karl-Ruediger; and Taubitz, Christof, to BASF Aktiengesellschaft. Sheet-like, multi-layer, laser-optical recording material. 4,889,756, Cl. 428-64.000.

BASF Aktiengesellschaft: *See—*
Barzynski, Helmut; Benthack-Thomas, Heidi; Hellwig, Karl-Ruediger; and Taubitz, Christof, 4,889,756, Cl. 428-64.000.
Bott, Kaspar; Hartmann, Horst; and Guth, Josef, 4,889,950, Cl. 560-205.000.
Dunfield, Lawrence G.; and Lok, Kar P., 4,888,983, Cl. 73-104.000.
Fuchs, Hugo; Ritz, Josef; Thomas, Erwin; and Weiss, Franz-Josef, 4,889,704, Cl. 423-387.000.
Gurak, Nur R.; Thompson, Ronald J.; Russell, James P.; and Yarkovsky, Joseph M., 4,889,670, Cl. 264-50.000.
Lange, Arno; Wuerzer, Bruno; and Meyer, Norbert, 4,889,554, Cl. 71-118.000.
Schuster, Ludwig; Hettche, Albert; Liedy, Werner; Weiss, Stefan; and Ehemann, Leo, 4,889,897, Cl. 525-388.000.

BASF Corporation: *See—*
Baghdachi, Jamil, 4,889,903, Cl. 528-17.000.

Basic American Foods: *See—*
Shatila, Mounir A., 4,889,734, Cl. 426-444.000.

Bass Pro Shops, Inc.: *See—*
Morris, John L., 4,888,908, Cl. 43-42.140.

Bassi, Mauro; Garagnani, Enea; and Gorini, Giuseppe, to Himont Incorporated. Elastoplastic compositions and process for preparing them. 4,889,888, Cl. 525-75.000.

Basu, Santanu; and Byer, Robert L., to Leland Stanford, Jr. University, Board of Trustees of. Fiber coupled diode pumped moving solid state laser. 4,890,289, Cl. 372-33.000.

Batchelor, Jay A., to Procter & Gamble Company, The. Medicament package for increasing compliance with complex therapeutic regimens. 4,889,238, Cl. 206-535.000.

Bates, Cameron: *See—*
Seth-Smith, Nigel; Bates, Cameron; Lim, Samson; Rassel, William van; Yoneda, Robert; and Lucas, Keith, 4,890,319, Cl. 380-5.000.
Seth-Smith, Nigel; Bates, Cameron; Lim, Samson; van Rassel, William; Yoneda, Robert; and Lucas, Keith, 4,890,321, Cl. 380-20.000.

Battelle Memorial Institute: *See—*
Jensen, George A.; Nelson, David A.; and Molton, Peter M., 4,889,660, Cl. 252-646.000.

Battenfeld Fischer Blasformtechnik GmbH: *See—*
Wortberg, Johannes; Junk, Paul B.; and Franke, Harry, 4,889,477, Cl. 425-133.100.

Batts, Inc.: *See—*
Morgan, Donald F., 4,889,265, Cl. 223-96.000.

Bauer, Dennis P.: *See—*
Laurenzo, Kathleen S.; and Bauer, Dennis P., 4,889,954, Cl. 564-298.000.

Bauer, Heike: *See—*
Kowatsch, Ulrich; and Bauer, Heike, 4,889,359, Cl. 280-629.000.

Baumann, Heinz, to Spirella AG. Splashguard for a bathtub. 4,888,835, Cl. 4-609.000.

Baumert, Dietrich: *See—*
Wegner, Peter; Kruger, Hans-Rudolf; Baumert, Dietrich; and Joppien, Hartmut, 4,889,870, Cl. 514-429.000.

Baxter International Inc.: *See—*
Foote, Mark A.; and Carter, Stephen J., 4,889,231, Cl. 206-363.000.
Fowles, Thomas A., 4,889,256, Cl. 220-306.000.

Bayer Aktiengesellschaft: *See—*
Forster, Heinz; Eue, Ludwig; Schmidt, Robert R.; and Lurssen, Klaus, 4,889,946, Cl. 560-21.000.
Franke, Joachim; Goyert, Wilhelm; and Kipphardt, Helmut, 4,889,908, Cl. 521-115.000.
Naumann, Klaus; and Behrenz, Wolfgang, 4,889,872, Cl. 514-531.000.
Pielartzik, Harald; Ebert, Wolfgang; Meyer, Rolf-Volker; Traenckner, Hans-Joachim; and Ostlinning, Edgar, 4,889,911, Cl. 528-182.000.

Bayer, Helmut, to Electrovac Fabrikation Ellectrotechnisher Spezialartkel Gesellschaft mbH. Apparatus for regulation or limitation of temperature. 4,889,971, Cl. 219-449.000.

BCIRA: *See—*
Chilton, David C.; and Simmons, Richard E., 4,888,982, Cl. 73-81.000.

Beal, Lawrence E., to Eagle-Picher Industries, Inc. Apparatus for cooling a web. 4,889,146, Cl. 134-64.00R.

Beale, William T., to Sunpower, Inc. Magnetic driven hydrodynamic lubrication system for free piston stirling engine. 4,888,950, Cl. 60-520.000.

Beale, William T., to Sunpower, Inc. Phase synchronization and vibration cancellation for free piston Stirling machines. 4,888,951, Cl. 60-520.000.

Beam, Don E.; and Sampson, Harold J., to NCR Corporation. Process and apparatus for retaining a circuit board in a mounted position in a computer housing. 4,890,198, Cl. 361-399.000.

Bean, Donald E.; and Coleman, Billy M., to Sperry Marine Inc. Step data processor for 180X and 90X compass synchro data. 4,890,105, Cl. 341-116.000.

Beare, Winston. Method of mounting of tiles at the hip of a roof. 4,888,932, Cl. 52-748.000.

Beatrice/Hunt-Wesson, Inc.: *See—*
Price, Judith E., 4,889,740, Cl. 426-606.000.

Beatty, William E., Jr.: *See—*
McKee, Jere L.; Beatty, William E., Jr.; and Thomas, Glenn R., 4,890,081, Cl. 335-18.000.

Beaupre, Richard F., to Texaco Inc. Separation of gases. 4,889,541, Cl. 55-16.000.

Bechstedt, Wolfgang: *See—*
Amberg, Guenther; Bechstedt, Wolfgang; Schulz, Paul; and Trabitzsch, Uwe, 4,889,644, Cl. 252-8.900.

Beck, Eliezer: *See—*
Yescheskel, Herzel B.; Alon, Gad; and Beck, Eliezer, 4,888,856, Cl. 19-0.270.

Beck, Martin H., to Devtech, Inc. One piece self-standing blow molded plastic containers. 4,889,752, Cl. 428-36.920.

Becker, Ludwig: *See—*
Peters, Jens; and Becker, Ludwig, 4,890,056, Cl. 324-83.00D.

Becker, Michael W.: *See—*
Najjar, Mitri S.; and Becker, Michael W., 4,889,699, Cl. 423-210.000.

Beckerman, Howard L. Emergency light control and battery charging system. 4,890,004, Cl. 307-66.000.

Beckman Instruments, Inc.: *See—*
Blough, William M., Jr., 4,889,611, Cl. 204-411.000.
Buzza, Edmund E.; and Jackson, Delbert D., 4,888,998, Cl. 73-864.210.
McNeal, Jack D.; Levine, Mark; and Beery, J. Harvey, 4,889,613, Cl. 204-416.000.

Bedient, Robert A.: *See—*
Guinn, Perry W.; Mills, Gary N.; Bedient, Robert A.; and Greeley, Martin O., 4,889,812, Cl. 435-289.000.

Beecher, William H. Female urinary collection devices having hollow-walled filled urine receptacles. 4,889,533, Cl. 604-330.000.

Beery, J. Harvey: *See—*
McNeal, Jack D.; Levine, Mark; and Beery, J. Harvey, 4,889,613, Cl. 204-416.000.

Beery, Jack: *See—*
Duke, Ronald J.; and Beery, Jack, 4,889,293, Cl. 242-75.510.

Behrenz, Wolfgang: *See—*
Naumann, Klaus; and Behrenz, Wolfgang, 4,889,872, Cl. 514-531.000.

Beker, Henry J.; Halliden, Paul W.; and Friend, John M. K., to Racal-Guardata Limited. Data communication systems and methods. 4,890,323, Cl. 380-25.000.

Belcher, R. Allan, to Burr-Brown Corporation. Apparatus and methods for digital-to-analog conversion using modified LSB switching. 4,890,106, Cl. 341-144.000.

Belenkii, Boris G.: *See—*
Svec, Frantisek; Bleha, Miroslav; Tennikova, Tatiana B.; and Belenkii, Boris G., 4,889,632, Cl. 210-500.280.

Bell Communications Research, Inc.: *See—*
Judd, Thomas H.; and Smoot, Lanny S., 4,890,314, Cl. 379-53.000.

Bell, Noel G. Tunnel construction. 4,889,448, Cl. 405-135.000.

Belser, John W.: *See—*
Vaughan, Robert A.; and Belser, John W., 4,888,929, Cl. 52-400.000.

Ben-Dov, Meir. Bone growth stimulator. 4,889,111, Cl. 128-419.00F.

Benahim, Guy; Dutaut, Jean-Michel; and Giraudon, Jean-Claude, to Thomson-CSF. Device to control the output power of a class C amplifier. 4,890,070, Cl. 330-296.000.

Beneficial Management Corporation of America: *See—*
Longfield, Ross N., 4,890,228, Cl. 364-408.000.

Benjamin, Roland J., to Hughes Aircraft Company. Rotating cylindrical beam splitter. 4,889,418, Cl. 350-486.000.

Bennett, James R., to Thermo Blender Inc. Combination container cap and blender adapter. 4,889,248, Cl. 215-100.00R.

Benninger AG: *See—*
Weber, Hans, 4,888,840, Cl. 8-151.000.

Benthack-Thomas, Heidi: *See—*
Barzynski, Helmut; Benthack-Thomas, Heidi; Hellwig, Karl-Ruediger; and Taubitz, Christof, 4,889,756, Cl. 428-64.000.

Bentivoglio, Giovanni, to Tovel Manufacturing Limited. Hydraulic cylinder. 4,889,038, Cl. 92-110.000.

Berg, Christoph: *See—*
Oldendorf, Christian; Berg, Christoph; and Melcher, Franz-Josef, 4,890,246, Cl. 364-567.000.

Berger, Michel, to Pradom Limited. Fluid flow control method and apparatus for a positive displacement engine or compressor. 4,889,088, Cl. 123-188.00B.

Bergmann, Erich; and Braus, Jurgen, to Balzers Aktiengesellschaft. Composite material having a slide layer applied by cathode sputtering. 4,889,772, Cl. 428-547.000.

Bergmann, Konrad, to American Standard Inc. Cartridge valve assembly. 4,889,157, Cl. 137-454.500.

Bergsten, Lars, to Saab-Scania Aktiebolag. Tensioning arrangement for a power-transmitting element incorporated in a transmission. 4,889,087, Cl. 123-90.310.

Bergstrom, Anders, to AB Tetra Pak. Distribution-transferring device for articles to be conveyed incorporated in a conveyer. 4,889,223, Cl. 198-364.000.

Berkowitz, Murray; and Abraham, John, to John Deere Technologies International, Inc. Rotary valve for natural gas rotary engine. 4,889,091, Cl. 123-219.000.

Bernasconi, Christian: *See*—
Aurelle, Yves; Bernasconi, Christian; Besombes-Vailhe, Jean; Julien, Edmond; and Roques, Henri, 4,889,537, Cl. 44-53.000.

Berninger, Mark S.: *See*—
Flesher, Robert W.; Berninger, Mark S.; and Blakesley, Robert W., 4,889,610, Cl. 204-299.00R.

Bertagnolli, Emmerich; and Weger, Peter, to Siemens Aktiengesellschaft. Bipolar transistor structure for very high speed circuits and method for the manufacture thereof. 4,889,823, Cl. 437-31.000.

Bertels, Ludger: *See*—
Loewe, Erhard; and Bertels, Ludger, 4,889,292, Cl. 242-71.100.

Bertotti, Franco; Ferrari, Paolo; and Gatti, Maria T., to SGS Microelettronica Spa. Integrated device for shielding charge injection into the substrate, in particular in driving circuits for inductive and capacitive loads. 4,890,149, Cl. 357-48.000.

Bertrand, John; and Noah, Matthew J., to ITT Corporation. Multi-rate digital voice coder apparatus. 4,890,327, Cl. 381-38.000.

Besecke, Sigmund; Knebel, Joachim; Schroeder, Guenter; and Ude, Werner, to Rohm GmbH. Thermoplastic polyarylene ethers. 4,889,909, Cl. 528-125.000.

Besombes-Vailhe, Jean: *See*—
Aurelle, Yves; Bernasconi, Christian; Besombes-Vailhe, Jean; Julien, Edmond; and Roques, Henri, 4,889,537, Cl. 44-53.000.

Besson, Bernard; Kalck, Philippe; and Thorez, Alain, to Rhone-Poulenc Chimie de Base. Dinuclear and water-solubie rhodium complexes and hydroformylation catalysis therewith. 4,889,957, Cl. 568-454.000.

Beteiligungsgesellschaft mbH: *See*—
Scherzinger, Werner; and Neher, Paul, 4,888,963, Cl. 66-151.000.

Betz Laboratories, Inc.: *See*—
Forester, David R., 4,889,614, Cl. 208-48.0AA.

Beutler, Scott D., to Motorola, Inc. Miniature shield with opposing cantilever spring fingers. 4,890,199, Cl. 361-424.000.

Bevill, Fred; and Kaufman, Theodore P., to Bevill, Fred. Electronic fuel control device and method. 4,889,097, Cl. 123-478.000.

Beyer, Hans-Ernst; Bonitz, Jorg; Entenmann, Robert; Forster, Siegmar; Knab, Rochus; Kunzel, Walter; Kugler, Wolfgang; Mahlberg, Alfred; Miller, Bernhard; Philipp, Matthias; Rohde, Siegfried; Unland, Stefan; Viess, Walter; Winter, Herbert; and Zimmermann, Jurgen, to Robert Bosch GmbH. Method for recognizing the power stroke of a cylinder of an internal combustion engine. 4,889,094, Cl. 123-414.000.

Beyer, Michael B., to E Street Enterprises, Inc. Vacuum pump and closure assembly for beverage container. 4,889,250, Cl. 215-228.000.

Bhagavatula, Venkata A.; and Charlton, David E., to Corning Incorporated. Asymmetrical bidirectional telecommunication system. 4,889,404, Cl. 350-96.160.

Bhardwaj, R. Chandra: *See*—
Khan, M. M. Taqui; and Bhardwaj, R. Chandra, 4,889,604, Cl. 204-157.500.

Biermann, Manfred: *See*—
Schmid, Karl H.; and Biermann, Manfred, 4,889,925, Cl. 536-18.600.

Bijma, Jan; and Van Den Beld, Antonius J. M., to U.S. Philips Corporation. Color display tube having electrode converging means. 4,890,032, Cl. 313-412.000.

Billings, David L., to General Electric Company. Connection arrangement. 4,889,443, Cl. 403-365.000.

Biomedical Sensors Limited: *See*—
Markle, David R.; Crane, Barry C.; and Irvine, Michael P., 4,889,407, Cl. 350-96.290.

Bippus, Hans-Dieter: *See*—
Walker, Robert; Fitzgerald, Robert; and Bippus, Hans-Dieter, 4,889,405, Cl. 350-96.210.

Bird, Philip H., to U.S. Philips Corporation. Circuit for driving a semiconductor device with protection against transients. 4,890,020, Cl. 307-571.000.

Birmingham, Virginia A.; Cox, Karen L.; and Seno, Eugene T., to Eli Lilly and Company. Tylosin resistance-conferring gene, designated tlrC, for use in *streptomyces fradiae*. 4,889,809, Cl. 435-252.300.

Bisio, Paul D.: *See*—
Royce, Ralph R.; Kremer, Bernard K.; and Bisio, Paul D., 4,889,643, Cl. 252-8.800.

Bison-Werke Baehre: *See*—
Bartling, Werner; and Jagode, Fritz H., 4,888,884, Cl. 34-32.000.

Blakesley, Robert W.: *See*—
Flesher, Robert W.; Berninger, Mark S.; and Blakesley, Robert W., 4,889,610, Cl. 204-299.00R.

Blanche, Andre, to Societe Anonyme Financiere, Industrielle et Commerciale d'Equipements Automobiles et Aeronautiques-FICEA. System for mounting different types of bulb on the reflector of a lamp. 4,890,202, Cl. 362-61.000.

Blecha, William E.: *See*—
Lisnyansky, Khaim; and Blecha, William E., 4,889,599, Cl. 162-263.000.

Bleha, Miroslav: *See*—
Svec, Frantisek; Bleha, Miroslav; Tennikova, Tatiana B.; and Belenkii, Boris G., 4,889,632, Cl. 210-500.280.

Blischok, Monica: *See*—
Bartell, Ralph; Boissonneault, Roger; and Blischok, Monica, 4,889,236, Cl. 206-531.000.

Blondin, Jean-Marie: *See*—
Malfroid, Pierre; Nguyen, Qui Long; Blondin, Jean-Marie; and Burnay, Jean-Paul, 4,889,892, Cl. 525-186.000.

Blough, William M., Jr., to Beckman Instruments, Inc. Flow cell. 4,889,611, Cl. 204-411.000.

Blue Space Submersibles, Inc.: *See*—
Neil, Alan; Hesketh, Gary W.; and Bojeck, Gary, 4,889,066, Cl. 114-334.000.

Bluethgen, Waldemar: *See*—
Kriegesmann, Jochen; Franek, Henning; and Bluethgen, Waldemar, 4,889,548, Cl. 65-305.000.

BOC Group, Inc., The: *See*—
Latif, Sherif; and Ryan, Robert F., 4,889,708, Cl. 424-43.000.

Boe, Einar, to Norsk Hydro a.s. Hydraulic operated underreamer. 4,889,197, Cl. 175-267.000.

Boehringer Ingelheim KG: *See*—
Kladders, Heinrich, 4,889,114, Cl. 128-203.150.

Boehringer Mannheim GmbH: *See*—
Krieg, Aloisius; Huger, Alois; and Schnetter, Wolfgang, 4,889,918, Cl. 530-350.000.

Boeing Company, The: *See*—
Edwards, Frank E.; and Wilcken, Stephen W., 4,889,425, Cl. 356-152.000.
Graham, Wesley H.; Axter, Sven E.; and Lin, Fu-Shiong, 4,889,569, Cl. 148-130.000.
Pinson, George T., 4,889,400, Cl. 350-96.300.

Boeshart, Patrick E. Concrete forming system. 4,889,310, Cl. 240-41.000.

Bohner, John J.; and Conley, Peter L., to Hughes Aircraft Company. Dynamic motor controller. 4,890,027, Cl. 310-328.000.

Boissenot, Philippe: *See*—
Selle, Daniel; and Boissenot, Philippe, 4,889,821, Cl. 437-31.000.
Selle, Daniel; Boissenot, Philippe; and Rabinzohn, Patrick, 4,889,824, Cl. 437-31.000.

Boissonneault, Roger: *See*—
Bartell, Ralph; Boissonneault, Roger; and Blischok, Monica, 4,889,236, Cl. 206-531.000.

Bojeck, Gary: *See*—
Neil, Alan; Hesketh, Gary W.; and Bojeck, Gary, 4,889,066, Cl. 114-334.000.

Bolger, Steven H.: *See*—
Williams, Richard K.; Bolger, Steven H.; and Rothacher, Duane J., 4,890,146, Cl. 357-23.800.

Bolin, Garry J.: *See*—
Allison, James R.; and Bolin, Garry J., 4,890,093, Cl. 340-567.000.

Bolton, David R. Cooler caddy for golf cart. 4,889,267, Cl. 224-274.000.

Bolz, Hans-Peter: *See*—
Adams, Samuel F.; and Bolz, Hans-Peter, 4,889,294, Cl. 242-118.300.

Bompard, Bruno; Debaille, Christian; and Bruyere, Alain, to Brochier S.A. Multilayer textile material and method and apparatus for producing the same. 4,889,063, Cl. 112-402.000.

Bond, Christopher R.: *See*—
Rockford, David B.; Sutton, William H.; Bond, Christopher R.; and Wilkinson, Brian, 4,889,638, Cl. 210-703.000.

Bond, Malcolm L.; and Dempster, Philip T., to Loredan Biomedical, Inc. Exercise and diagnostic system and method. 4,889,108, Cl. 128-25.00R.

Bonitz, Jorg: *See*—
Beyer, Hans-Ernst; Bonitz, Jorg; Entenmann, Robert; Forster, Siegmar; Knab, Rochus; Kunzel, Walter; Kugler, Wolfgang; Mahlberg, Alfred; Miller, Bernhard; Philipp, Matthias; Rohde, Siegfried; Unland, Stefan; Viess, Walter; Winter, Herbert; and Zimmermann, Jurgen, 4,889,094, Cl. 123-414.000.

Booher, Benjamin V., to Suspension Group, Ltd. Composite tractor/-trailer beam spring suspension system. 4,889,361, Cl. 280-718.000.

Bordere, Serge; Pagniez, Guy; and Potin, Philippe, to Atochem. Purification of crude polyorganophosphazenes. 4,889,910, Cl. 528-168.000.

Borghi, Italo: *See*—
Canova, Luciano; Giannini, Umberto; Albizzati, Enrico; Borghi, Italo; and Proto, Antonio, 4,889,896, Cl. 525-375.000.

Borgmann, Michael: *See*—
Mahlich, Gotthard C.; and Borgmann, Michael, 4,889,041, Cl. 99-285.000.

Bortolin, Bruno: *See*—
Mariani, Beniamino; and Bortolin, Bruno, 4,889,399, Cl. 350-96.200.

Boscolo, Antonio: *See*—
Baggio, Dino; and Boscolo, Antonio, 4,890,244, Cl. 364-551.010.

Bostwick, Norvan W., to AIL Corporation. Fuel viscosity/density compensation device. 4,889,092, Cl. 123-381.000.

Bott, Kaspar; Hartmann, Horst; and Guth, Josef, to BASF Aktiengesellschaft. Preparation of carboxylic esters. 4,889,950, Cl. 560-205.000.

Boucher, Robert C. Scuba tank mounting bracket. 4,889,306, Cl. 248-313.000.

Bouhours, Jean-Paul, to Hutchinson. Hydraulic antivibratory supports. 4,889,326, Cl. 267-140.100.

Bouldin, Eric W.: *See*—
Drexler, Jerome; and Bouldin, Eric W., 4,889,979, Cl. 235-454.000.

Bourbon, Robert M.; and Ryan, John J., Jr., to Procter & Gamble Cellulose Company, The. Process for making wet-laid structures containing individualized stiffened fibers. 4,889,597, Cl. 162-157.600.

Bourbon, Robert M.: *See*—
Schoggen, Howard L.; Cook, Jeffrey T.; and Bourbon, Robert M., 4,889,596, Cl. 162-157.600.

Bowen, William A.: *See*—
Hendixen, Arne B.; Bowen, William A.; Evans, Michael W.; Hurley, John J.; and Leslie, Samuel A., 4,890,315, Cl. 379-59.000.

Bozano, Enrico D. Air regulator for breathing apparatus. 4,889,115, Cl. 128-204.260.

Bradshaw, Robert J., II; and Bradshaw, Robert J., III. Method and means for securing glasses to a sun visor. 4,889,420, Cl. 351-47.000.

Bradshaw, Robert J., III: *See*—
Bradshaw, Robert J., II; and Bradshaw, Robert J., III, 4,889,420, Cl. 351-47.000.

Bradwell, Arthur R.; and Deverill, Ian, to Alta Diagnostic Machines Limited. Nephelometric method for determination of an antigen or antibody content in whole blood. 4,889,815, Cl. 436-517.000.

Bram, Jeffry M., to Raytheon Company. Variable length instruction decoding apparatus having cross coupled first and second microengines. 4,890,218, Cl. 364-200.000.

Brambach, Johan A., to Schreiner Luchtvaartgroep B.V. Sandwich material and the use thereof. 4,889,763, Cl. 428-246.000.

Brand, Peter: *See*—
Heitmann, Uwe; and Brand, Peter, 4,889,138, Cl. 131-84.100.

Brandenstein, Manfred; and Hetterich, Herrmann, to SKF GmbH. Method for installing bearing rings. 4,888,862, Cl. 29-148.40A.

Brandenstein, Manfred; Herrmann, Gerhard; and Haas, Roland, to SKF GmbH. Tension device for drive belt. 4,889,520, Cl. 474-135.000.

Brandon, Phillip J. Pill container calendar. 4,889,237, Cl. 206-534.000.

Brandt, Ronald L.: *See*—
Althouse, Rickie M.; Baer, Richard I.; and Brandt, Ronald L., 4,889,502, Cl. 439-607.000.

Brauer, Melvin; and Crawford, Clayton C., to CasChem, Inc. Urethane adhesives. 4,889,915, Cl. 525-458.000.

Braun, Peter: *See*—
Ehrhardt, Heinz; Mildenberger, Hilmar; Maier, Thomas; Schaller, Rainer; Sachse, Burkhard; and Braun, Peter, 4,889,864, Cl. 514-326.000.

Braus, Jurgen: *See*—
Bergmann, Erich; and Braus, Jurgen, 4,889,772, Cl. 428-547.000.

Brennan, Robert J.: *See*—
Philippson, Walter M.; Brennan, Robert J.; and Meighen, Terrence, 4,889,503, Cl. 439-610.000.

Bres, Michel: *See*—
Pelloux-Gervais, Pierre; Zapata, Richard; and Bres, Michel, 4,889,113, Cl. 128-201.250.

Brewer, Bradley J.: *See*—
Laidlaw, Curtis L.; and Brewer, Bradley J., 4,889,460, Cl. 411-437.000.

Bridgestone Corporation: *See*—
Hashimoto, Takatsugu; and Tomiya, Seisuke, 4,889,677, Cl. 264-297.500.
Oshima, Kazuo; and Iwasaki, Shizuo, 4,889,174, Cl. 152-529.000.

Briggs & Stratton Corporation: *See*—
Kolinske, Edmund C.; and Uuskallio, Arvo F., 4,889,006, Cl. 74-502.400.

Briguglio, James J.: *See*—
Roos, Leo; Axon, Fredrick J.; and Briguglio, James J., 4,889,790, Cl. 439-258.000.

British Aerospace, PLC: *See*—
Taylor, Brian W., 4,889,458, Cl. 411-383.000.

British Aerospace Pubic Limited Company: *See*—
Sedgbeer, Melvyn D., 4,889,984, Cl. 250-211.00R.

British Broadcasting Corporation: *See*—
Thomas, Graham A., 4,890,160, Cl. 358-105.000.

Britoil PLC: *See*—
Rockford, David B.; Sutton, William H.; Bond, Christopher R.; and Wilkinson, Brian, 4,889,638, Cl. 210-703.000.

Brochier S.A.: *See*—
Bompard, Bruno; Debaille, Christian; and Bruyere, Alain, 4,889,063, Cl. 112-402.000.

Brode, George L.: *See*—
Fan, You-Ling; Stanley, James P.; and Brode, George L., 4,889,887, Cl. 524-510.000.

Broghammer, Heinz: *See*—
Band, Gerhard; and Broghammer, Heinz, 4,889,519, Cl. 474-101.000.

Bron, Raymond. Aircraft landing gear maintenance and weighing system. 4,889,202, Cl. 177-134.000.

Brooks, Richard E. Self-loading sailboat trailer. 4,889,465, Cl. 414-546.000.

Brose Fahrzeugteile GmbH & Co. Kommanditgesellschaft: *See*—
Hess, Hans-Peter; and Hlousek, Peter, 4,888,916, Cl. 49-352.000.

Brosnan, Denis A.; Whetsel, James E.; Singer, Richard E.; Samas, Mark V.; Amos, Michael D.; and Kovarik, David P., to Erico International Corporation. Exothermic welding apparatus and method. 4,889,324, Cl. 266-157.000.

Brown, Alfred R.; and Mackrell, Andrew D., to Graviner Limited. Detection of electromagnetic radiation. 4,889,994, Cl. 250-374.000.

Brown, Herman O., Jr. Stand for safety sign or the like. 4,888,894, Cl. 40-606.000.

Brown, James W., Sr.; and Sondermeyer, Jack C., to Peavey Electronics Corporation. Specialized amplifier systems for musical instruments. 4,890,331, Cl. 381-120.000.

Brown, Paul L.; and Stickles, David L., to Dow Corning Corporation. Pressure sensitive adhesive release liner and fluorosilicone compounds, compositions and method therefor. 4,889,753, Cl. 428-40.000.

Brown, Ronald W., to Thermo King Corporation. Bus air conditioner suitable for mounting within the normal profile of a bus. 4,888,959, Cl. 62-244.000.

Browne, Leslie J., to Ciba-Geigy Corp. Substituted imidazo[1,5-a]pyridine derivatives and other substituted bicyclic derivatives and their use as aromatase inhibitors. 4,889,861, Cl. 514-300.000.

Browne, Ronnie, to Memron, Inc. Filter cartridge having a tunable asymmetric fluoropolymer alloy filter membrane. 4,889,626, Cl. 210-359.000.

Broze, Guy, to Colgate-Palmolive Company. Acetylated sugar ethers as bleach activators and detergency boosters. 4,889,651, Cl. 252-95.000.

Brudny, Alex: *See*—
Rosenberg, Larry; Chadwick, Curt H.; and Brudny, Alex, 4,889,676, Cl. 264-255.000.

Brunel, Andre, to Robert Bosch GmbH. Fuel injection pump for internal combustion engines. 4,889,096, Cl. 123-450.000.

Brunner Engineering & Manufacturing Inc.: *See*—
Sloan, Mark D., 4,889,180, Cl. 165-30.000.

Brunswick Valve & Control, Inc.: *See*—
Abraham, William F., 4,889,002, Cl. 74-89.150.

Brustle, Klaus: *See*—
Rock, Erich; Rupprechter, Helmut; and Brustle, Klaus, 4,888,853, Cl. 16-240.000.

Bruyere, Alain: *See*—
Bompard, Bruno; Debaille, Christian; and Bruyere, Alain, 4,889,063, Cl. 112-402.000.

Bryan, David E.; Dudding, Carl M.; and Martin, John W., to Gals Industries, Inc. Sight glass apparatus. 4,888,990, Cl. 73-326.000.

Buck, Charles E.: *See*—
Ahmed, Fahim U.; and Buck, Charles E., 4,889,653, Cl. 252-99.000.

Buck, David A. Drilling jar latch. 4,889,198, Cl. 175-304.000.

Buckner, Robert; and Morris, Mae. Heliochron. 4,890,269, Cl. 368-15.000.

Buddy L Corp.: *See*—
Auer, Robert T.; Keats, Richard L.; and Chung, Jore M., 4,889,514, Cl. 446-230.000.
Auer, Robert T.; and Reina, David, 4,889,515, Cl. 446-428.000.
Auer, Robert T.; and Reina, David, 4,889,516, Cl. 446-462.000.
Oster, Francis, 4,888,874, Cl. 33-18.100.

Buehning, Peter G., to Accurate Products Co. Melt blowing die and air manifold frame assembly for manufacture of carbon fibers. 4,889,476, Cl. 425-72.200.

Bugnon, Philippe; and Medinger, Bernhard, to Ciba-Geigy Corporation. Organic pigments coated with crosslinked ethyl cellulose. 4,889,562, Cl. 106-204.000.

Buhlmayer, Peter; Stanton, James L.; Fuhrer, Walter; Goschke, Richard; Rasetti, Vittorio; and Rueger, Heinrich, to Ciba-Geigy Corporation. Antihypertensive 5-amino-4-hydroxyvaleryl derivatives substituted by sulphur-containing groups. 4,889,869, Cl. 514-400.000.

Bujalski, Duane R.; Le Grow, Gary E.; Lipowitz, Jonathan; and Lim, Thomas F., to Dow Corning Corporation. Method of producing silicon carbide preceramic vinyl-containing polymers. 4,889,899, Cl. 525-479.000.

Buljan, Sergej-Tomislav V.; and Geary, Earl G., Jr., to GTE Laboratories Incorporated. Titanium diboride-based composite articles with improved fracture toughness. 4,889,836, Cl. 501-97.000.

Bull S.A.: *See*—
Champiau, Robert, 4,890,183, Cl. 361-86.000.

Burch, Robert R., to Du Pont de Nemours, E. I., and Company. Process for adhering aramid polymers. 4,889,579, Cl. 156-305.000.

Burdeska, Kurt: *See*—
Hefti, Heinz; Artz, Klaus; Weber, Kurt; Burdeska, Kurt; and Reinehr, Dieter, 4,889,655, Cl. 252-301.220.

Burke, David T.: *See*—
Olson, Maynard V.; and Burke, David T., 4,889,806, Cl. 435-172.300.

Burkes, Alice L.: *See*—
Roberts, Bruce A.; and Burkes, Alice L., 4,889,730, Cl. 426-102.000.

Burlingame, Nicholas H.: *See*—
Morris, Jeffrey R.; and Burlingame, Nicholas H., 4,889,481, Cl. 431-328.000.

Burnay, Jean-Paul: *See*—
Malfroid, Pierre; Nguyen, Qui Long; Blondin, Jean-Marie; and Burnay, Jean-Paul, 4,889,892, Cl. 525-186.000.

Burndy Corporation: *See*—
Lazar, Michael; and Noschese, Rocco, 4,889,500, Cl. 439-579.000.

Burnett, Mildred M.: *See*—
Burnett, Ronald D.; and Burnett, Mildred M., 4,889,512, Cl. 446-72.000.

Burnett, Ronald D.; and Burnett, Mildred M. Doll and pillow carrying case. 4,889,512, Cl. 446-72.000.

Burns, Gary T., to Dow Corning Corporation. Process for the preparation of methylpolysilanes having controlled carbon content. 4,889,904, Cl. 528-25.000.

Burns, Russell W., to Concord Industries, Inc. Apparatus for rotatably mounting a winch within an enclosure. 4,889,321, Cl. 254-332.000.

Burr-Brown Corporation: *See*—
Belcher, R. Allan, 4,890,106, Cl. 341-144.000.

Burst, Hermann; Durm, Jurgen; Kretschmer, Helmut; and Schuhmann, Georg, to Porsche AG. Vehicle spoiler arrangement. 4,889,382, Cl. 296-180.500.

Burt, Jerry D. Air filtering system. 4,889,543, Cl. 55-97.000.

Burton, Aubrey T.: *See*—
Banyasz, Joseph L.; Burton, Aubrey T.; LaRoy, Bernard C.; and Lowitz, David A., 4,890,053, Cl. 324-58.50A.

Buschow, Kurt H. J., to U.S. Philips Corporation. Method of producing the magnetic metallic layers having a low thermal coefficient of expansion. 4,889,607, Cl. 204-192.150.

Bush, J. Finley, to Aluminum Company of America. Reclaiming spent potlining. 4,889,695, Cl. 423-132.000.

Buswell, John A.; and Odier, Etienne, to Institut National de la Recherche Aronomique. Microorganisms of the *Phanerochaete chrysosporium* strain and their use. 4,889,807, Cl. 435-192.000.

Butina I/S: *See*—
Haumann, Klaus; and Kildegaard, Ejvind, 4,888,855, Cl. 17-1.00A.

Butt, Sheldon H., to Olin Corporation. Sealed semiconductor casing. 4,889,960, Cl. 174-52.400.

Buzza, Edmund E.; and Jackson, Delbert D., to Beckman Instruments, Inc. Sample handling system. 4,888,998, Cl. 73-864.210.

Byer, Robert L.: *See*—
Basu, Santanu; and Byer, Robert L., 4,890,289, Cl. 372-33.000.

Byrns, James E. Duck house. 4,889,075, Cl. 119-23.000.

C. D. Medical, Inc.: *See*—
Guinn, Perry W.; Mills, Gary N.; Bedient, Robert A.; and Greeley, Martin O., 4,889,812, Cl. 435-289.000.

C & D Power Systems, Inc.: *See*—
Misra, Sudhan S.; and Noveske, Terrence M., 4,889,778, Cl. 429-190.000.

Cabelmann, Erich: *See*—
Zapfel, Horst; and Cabelmann, Erich, 4,888,966, Cl. 69-41.000.

Cabletron, Inc.: *See*—
Oliver, Christopher J., 4,890,102, Cl. 340-825.170.

Cacheris, William P.: *See*—
Rocklage, Scott M.; Cacheris, William P.; and Jamieson, Gene, 4,889,931, Cl. 540-465.000.

Cadillac Rubber & Plastics, Inc.: *See*—
Kerzich, Anthony A.; and McClure, Douglas M., 4,889,168, Cl. 138-103.000.

Cadwell, Gilbert C.; and Phillips, Paul M., to Rohr Industries, Inc. Method and apparatus for forming and bonding metal assemblies. 4,889,276, Cl. 228-265.000.

Calderwood, William A. Lighter-than-air-furniture. 4,888,836, Cl. 5-10.00B.

Call, Tom: *See*—
Zucker, Joseph; Shen, Nelson M.; Campbell, Bruce D.; Rodhe, Peder; and Call, Tom, 4,889,403, Cl. 350-96.150.

Cameron, David B., to Thetford Corporation. Toilet with manual flush. 4,888,832, Cl. 4-321.000.

Campbell, Bruce D.: *See*—
Zucker, Joseph; Shen, Nelson M.; Campbell, Bruce D.; Rodhe, Peder; and Call, Tom, 4,889,403, Cl. 350-96.150.

Campbell, Donald H.; and Evarts, Gerald L., to Occidental Chemical Corporation. Resistance welding of galvanized steel. 4,889,773, Cl. 428-552.000.

Campbell, Lyall J., to Camryde Industries Limited. Tipping trays. 4,889,390, Cl. 298-5.000.

Campbell, Roy E.; Wilkinson, John D.; and Hudson, Hank M., to Elcor Corporation. Hydrocarbon gas processing. 4,889,545, Cl. 62-24.000.

Campbell Soup Company: *See*—
Wythoff, Willem, 4,888,935, Cl. 53-478.000.

Camryde Industries Limited: *See*—
Campbell, Lyall J., 4,889,390, Cl. 298-5.000.

Candy, Bruce H., to Minelab Electronic Industries Ltd. Metal detector sensing head with reduced eddy current coils. 4,890,064, Cl. 324-329.000.

Cannella, Vincent D., to Ovonic Imaging Systems, Inc. Continuous dry etching system. 4,889,609, Cl. 204-298.000.

Canon Kabushiki Kaisha: *See*—
Hasegawa, Masahide, 4,890,165, Cl. 358-213.260.
Inuyama, Toshihiko; Kimizuka, Junichi; Kusano, Akihisa; Sato, Kaoru; and Soya, Takashi, 4,890,288, Cl. 372-31.000.
Komuro, Hirokazu, 4,889,587, Cl. 156-643.000.
Tezuka, Nobuo, 4,890,175, Cl. 360-97.010.
Yamada, Yu, 4,889,416, Cl. 350-426.000.

Canova, Luciano; Giannini, Umberto; Albizzati, Enrico; Borghi, Italo; and Proto, Antonio, to Montedipe S.p.A. Process for the imidization of copolymers of maleic anhydride with vinyl-aromatic monomers. 4,889,896, Cl. 525-375.000.

Capes, C. Edward: *See*—
Mikhlin, Josef A., deceased; Ikura, Michio; Kelly, James F.; and Capes, C. Edward, 4,889,538, Cl. 44-90.000.

Capetola, Robert J.: *See*—
Kligman, Albert M.; Mezick, James A.; and Capetola, Robert J., 4,889,847, Cl. 514-171.000.

Caporiccio, Gerardo; Strepparola, Ezio; and Scarati, Mario A., to Montedison S.p.A. Fluoropolyethers containing end groups endowed with anchoring capacity. 4,889,939, Cl. 549-13.000.

Carl-Zeiss-Stiftung: *See*—
Faltermeier, Bernd, 4,889,426, Cl. 356-432.000.

Carl-Zeiss-Stiftung, Heidenhein/Brenz, doing business as Carl Zeiss: *See*—
Enderle, Eckhard; Kaufmann, Dieter; Muller; and Andrzejewski, Thomas, 4,888,877, Cl. 33-559.000.

Carlson, Allan I., to North American Philips Corporation. Apparatus for addressing active displays. 4,890,101, Cl. 340-811.000.

Carlson, Jerrold L., to E. F. Johnson Company. Graphite trace electrical interconnect. 4,889,961, Cl. 29-846.000.

Carlson, Sterling R. Printing press idle roller braking system. 4,889,211, Cl. 188-68.000.

Carpio S.r.l.: *See*—
Tomiolo, Andrea, 4,889,997, Cl. 250-561.000.

Carter, Stephen J.: *See*—
Foote, Mark A.; and Carter, Stephen J., 4,889,231, Cl. 206-363.000.

CasChem, Inc.: *See*—
Brauer, Melvin; and Crawford, Clayton C., 4,889,915, Cl. 525-458.000.

Casey, Shawn E.; and West, Terence H., to Seagate Technology, Inc. Crash stop and magnetic latch for a voice coil actuator. 4,890,176, Cl. 360-105.000.

Casio Computer Co., Ltd.: *See*—
Hara, Kazuya; and Rikuna, Kenji, 4,889,980, Cl. 235-488.000.

Castellini, Franco, to Castellini S.p.A. Compact apparatus for the support of suspended power driven instruments, in particular for dental surgery instruments. 4,889,488, Cl. 433-110.000.

Castellini S.p.A.: *See*—
Castellini, Franco, 4,889,488, Cl. 433-110.000.

Castleberry, Donald E.: *See*—
Parks, Harold G.; Piper, William W.; Possin, George E.; and Castleberry, Donald E., 4,889,411, Cl. 350-334.000.

Caughey, Robert A., to New Hampshire Flakeboard, Inc. Dryer for combustible chip-like material. 4,888,885, Cl. 34-33.000.

Causton, Peter: *See*—
Dust, Richard A.; and Causton, Peter, 4,889,884, Cl 524-314.000.

Cegedur Societe de Transformation de L'Aluminium Pechiney: *See*—
Charbonnier, Jean; and Goliard, Francois, 4,889,177, Cl. 164-97.000.

Centiforce (Proprietary) Limited: *See*—
Engelbrecht, Fillippus T., 4,888,871, Cl. 30-276.000.

Ceskoslovenska Akademie ved: *See*—
Svec, Frantisek; Bleha, Miroslav; Tennikova, Tatiana B.; and Belenkii, Boris G., 4,889,632, Cl. 210-500.280.

Cetus Corporation: *See*—
Gelfand, David H.; Stoffel, Susanne; Lawyer, Frances C.; and Saiki, Randall K., 4,889,818, Cl. 435-194.000.

Chadwick, Curt H.: *See*—
Rosenberg, Larry; Chadwick, Curt H.; and Brudny, Alex, 4,889,676, Cl. 264-255.000.

Chadwick, Donald T.; and Glass, Peter R., to American Seating Company. Chair seat-and-back support. 4,889,385, Cl. 297-302.000.

Chai, Bruce H.: *See*—
Hou, Janpu; Chai, Bruce H.; Badding, David D.; West, Gary A.; and Marcus, Stephen L., 4,889,993, Cl. 250-365.000.

Chai, Sie-Yearl: *See*—
Shepherd, Robin G.; Chai, Sie-Yearl; Lichty, Maynard E.; and Milowsky, Arnold S., 4,889,936, Cl. 548-149.000.

Chalmers, Brian D.; Mackenzie, Colin A.; and Kapoor, Kishore K., to Rodime PLC. Rotary voice coil micro-hard disk drive system. 4,890,174, Cl. 360-78.120.

Chamberlin, Louis D., Jr.; and Chamberlin, Mark D. Folding mechanic's creeper. 4,889,352, Cl. 280-32.600.

Chamberlin, Mark D.: *See*—
Chamberlin, Louis D., Jr.; and Chamberlin, Mark D., 4,889,352, Cl. 280-32.600.

Champ, Robert B.; Shattuck, Meredith D.; and Stremel, Donald A., to International Business Machines. Organic photoconductors with improved wear. 4,889,784, Cl. 430-58.000.

Champiau, Robert, to Bull S.A. Device for detecting cutoff and short circuit defects in at least one electrical circuit portion. 4,890,183, Cl. 361-86.000.

Chan, Kwok K.: *See*—
Watmough, David; and Chan, Kwok K., 4,889,122, Cl. 128-399.000.

Chandler, David A. Car wash apparatus. 4,889,147, Cl. 134-123.000.

Chang, Chia C. Multi-functional electrically activated stove. 4,889,972, Cl. 219-472.000.

Chang, Ching-Feng: *See*—
Lewis, Kenrick M.; and Chang, Ching-Feng, 4,889,838, Cl. 502-27.000.

Chapman, Richard A.: *See*—
Tang, Thomas E.; Wei, Che-Chia; Haken, Roger A.; and Chapman, Richard A., 4,890,141, Cl. 357-23.300.

Charbonneau, Jack W., to Minnesota Mining and Manufacturing Company. Fragrance releasing pull-out sampler. 4,889,755, Cl. 428-42.000.

Charbonnier, Jean; and Goliard, Francois, to Cegedur Societe de Transformation de L'Aluminium Pechiney. Method and apparatus for sand moulding composite articles with a die made of light alloy and a fibrous insert. 4,889,177, Cl. 164-97.000.

Charles Stark Draper Laboratory, Inc., The: *See*—
Van Broekhoven, Paul; and Guinon, Walter J., 4,890,055, Cl. 324-77.00B.

Charlton, David E.: *See*—
Bhagavatula, Venkata A.; and Charlton, David E., 4,889,404, Cl. 350-96.160.

Chartrand, Clement. Balcony ramp mounted table convertible into a seat. 4,889,057, Cl. 108-42.000.

Chasseguet, Gustave; and Paquin, Jacques, to Valeo. Torsion-damping flywheel. 4,889,218, Cl. 192-106.200.

Chatterjee, Pallab K., to Texas Instruments Incorporated. Method of fabricating an integrated circuit with metal interconnecting layers above and below active circuitry. 4,889,832, Cl. 437-203.000.

Chavkin, Leonard: *See*—
Mackles, Leonard; and Chavkin, Leonard, 4,889,709, Cl. 424-45.000.

Chehab, Firdausia; and Koch, Franz P., to Korber AG. Method of ascertaining the rate of fluid flow through the ventilation zones of rod-shaped articles of the tobacco processing industry. 4,888,977, Cl. 73-38.000.

Chen, Chenson K.; and Tsaur, Bor-Yeu, to Massachusetts Institute of Technology. Capping technique for zone-melting recrystallization of insulated semiconductor films. 4,889,583, Cl. 156-604.000.

Chen, Pao-Chaing, to Diversified Investments Corporation. Compound bicycle exercising apparatus. 4,889,335, Cl. 272-73.000.

Chenoweth, Vaughn C.; and Goodsell, Roger C., to Guardian Industries Corp. Non-woven fibrous product. 4,889,764, Cl. 428-283.000.

Cherkez, Stephan: *See—*
Vaya, Jacob; Ladkani, David; Schoenberger, Clara; Kaspi, Joseph; Salemnick, Gad; Yellin, Haim; and Cherkez, Stephan, 4,889,929, Cl. 540-318.000.

Chernega, John G.; Martens, John A.; Olsen, Roger A.; and Cottingham, Auburn B., deceased (by Cottingham, Sue E., administrator), to Minnesota Mining and Manufacturing Company. Electron beam curable copolymer useful in recording media. 4,889,895, Cl. 525-278.000.

Chesnut, M. Gaines; and Wood, W. Lawrence, to Ram-Line, Inc. Magazine for housing cartridges using a spirally wound conforce spring. 4,888,899, Cl. 42-50.000.

Chevallet, Jacques, to Hospal Industrie. Method and apparatus for controlling the quantities of liquid circulating in the dialysis liquid circuit of an artificial kidney. 4,889,635, Cl. 210-646.000.

Chevron Research Company: *See—*
English, Alan R., 4,889,617, Cl. 208-121.000.

Chiba, Kazuo: *See—*
Uno, Takaaki; Yamahata, Hiroshi; and Chiba, Kazuo, 4,889,328, Cl. 267-293.000.

Chien, Fong K. Buoy structure for detecting fishing grounds. 4,890,334, Cl. 455-89.000.

Chiku, Etsuko: *See—*
Kai, Masanobu; and Chiku, Etsuko, 4,889,711, Cl. 424-47.000.

Chilton, David C.; and Simmons, Richard E., to BCIRA. Method and apparatus for evaluating the hardening of chemically bonded foundry sand molds and cores. 4,888,982, Cl. 73-81.000.

Chin, Arthur A.; Johnson, Ivy D.; Kresge, Charles T.; and Sarli, Michael S., to Mobil Oil Corporation. Additive for vanadium capture in catalytic cracking. 4,889,615, Cl. 208-113.000.

Chiuminatta, Alan R.: *See—*
Chiuminatta, Edward; and Chiuminatta, Alan R., 4,889,675, Cl. 264-154.000.

Chiuminatta, Edward; and Chiuminatta, Alan R. Method for cutting unhardened concrete with a soft concrete saw. 4,889,675, Cl. 264-154.000.

Chiyoda Corporation: *See—*
Inuzuka, Toshio; Hasegawa, Tsutomu; Tomikawa, Minato; and Aoki, Shigeru, 4,889,766, Cl. 428-324.000.

Chmielewski, Konrad G., to Rheem Manufacturing Company. System and method for refrigeration and heating. 4,888,957, Cl. 62-84.000.

Choi, Il-Hyun: *See—*
Lee, Ki W.; and Choi, Il-Hyun, 4,888,988, Cl. 73-204.260.

Chou, George. Control circuit of the decorative light sets. 4,890,000, Cl. 307-36.000.

Chouinard, Gerald A., to Label Printers, The. Counterfeit resistant label and method of making the same. 4,889,365, Cl. 283-70.000.

Choun, Sain-Lu. Two-stage automobile bumper. 4,889,374, Cl. 293-132.000.

Chrisman, Roger P.: *See—*
Lambert, Maureen K.; and Chrisman, Roger P., 4,890,282, Cl. 370-79.000.

Christner, Juergen; Pfleiderer, Ernst; and Taeger, Tilmann, to Rohm GmbH. Methods for making leather. 4,889,811, Cl. 435-265.000.

Chrysler Motors Corporation: *See—*
Frantz, Douglas C., 4,890,231, Cl. 364-426.040.
Russell, Ronald W.; and Cox, Larry R., 4,888,854, Cl. 16-266.000.

Chu, Li, to Institute of Rock & Soil Mechanics Academia Sinica, The. Inductance strain gauge. 4,890,084, Cl. 336-30.000.

Chu, Pochen; Green, Larry A.; and Landis, Michael E., to Mobil Oil Corporation. Layered titanate containing interspathic silica catalysts. 4,889,839, Cl. 502-242.000.

Chu, Ven-Chung. Multi-function automatic revolving christmas tree base. 4,890,008, Cl. 307-149.000.

Chuang, Patrick T.; Yau, Robert L.; Yoshida, Hiroshi; and Wang, Moon-Yee, to Advanced Micro Devices. Content addressable memory array with maskable and resettable bits. 4,890,260, Cl. 365-49.000.

Chung, Jore M.: *See—*
Auer, Robert T.; Keats, Richard L.; and Chung, Jore M., 4,889,514, Cl. 446-230.000.

Ciba-Geigy Corp.: *See—*
Browne, Leslie J., 4,889,861, Cl. 514-300.000.
Bugnon, Philippe; and Medinger, Bernhard, 4,889,562, Cl. 106-204.000.
Buhlmayer, Peter; Stanton. James L.; Fuhrer, Walter; Goschke, Richard; Rasetti, Vittorio; and Rueger, Heinrich, 4,889,869, Cl. 514-400.000.
Hefti, Heinz; Artz, Klaus; Weber, Kurt; Burdeska, Kurt; and Reinehr, Dieter, 4,889,655, Cl. 252-301.220.
Kristen, Ulrich; and Wirth, Hermann O., 4,889,938, Cl. 549-10.000.
Pfenninger, Heinz, 4,889,633, Cl. 210-639.000.
Rosenberg, Siegfried; and Schwarzenbach, Kurt, 4,889,883, Cl. 524-289.000.
Su, Kai C.; and White, Jack C., 4,889,693, Cl. 422-113.000.
Tsao, Fupao, 4,889,689, Cl. 422-30.000.
Waldner, Adrian; and Meyer, Willy, 4,889,933, Cl. 546-114.000.

Cimenti, Giovanni: *See—*
Mailliet, Pierre; Lonardi, Emile; and Cimenti, Giovanni, 4,889,004, Cl. 74-479.000.

Clark, Graeme L.; and Maitland, Arthur, to English Electric Valve Company Limited. Laser apparatus. 4,890,295, Cl. 372-61.000.

Clayburn, Randall C., to RCA Licensing Corporation. High frequency signal suppression component. 4,890,044, Cl. 315-411.000.

Claycomb, Jack R.: *See—*
Uherek, Robert J., Sr.; and Claycomb, Jack R., 4,889,185, Cl. 166-243.000.

Cleary, Thomas P.: *See—*
Phalangas, Charalambos J.; and Cleary, Thomas P., 4,889,947, Cl. 560-119.000.

Clemson University: *See—*
Cross, Dee L., 4,889,732, Cl. 426-319.000.

Clerc, Jean-Frederic; Deutsch, Jean-Claude; Vaudaine, Pierre; and Vey, Sylvie, to Commissariat A l'Energie Atomique. Liquid crystal cell using the electrically controlled birefringence effect and a uniaxial medium of negative optical anisotropy usable therein. 4,889,412, Cl. 350-347.00E.

Cleveland Clinic Foundation, The: *See—*
Reger, Steven I.; Neth, Donald C.; and McGovern, Thomas F., 4,890,235, Cl. 364-468.000.

Clifford Electronics, Inc.: *See—*
Drori, Ze'Ev; and Segal, Moti, 4,890,108, Cl. 341-176.000.

Coaltex, Inc.: *See—*
Justice, James C.; and Delli-Gatti, Frank A., Jr., 4,889,392, Cl. 299-18.000.

Coca-Cola Company, The: *See—*
Smazik, Kenneth G., 4,889,148, Cl. 137-1.000.
Smith, Ira A., 4,889,662, Cl. 261-35.000.
Takehana, Tsutomu; Kouzai, Tetsuo; Sagara, Masaaki; Yaginuma, Tamio; and Sasaki, Teruji, 4,888,936, Cl. 53-510.000.

Cofusa Enterprises, Inc.: *See—*
Alcaraz, Alfonso; Aguilar, Gerardo; Gonzalez, Mauricio; and Elizarraraz, Antonio, 4,889,210, Cl. 186-38.000.

Cogan, Kevin C.; and Echols, Robert M., to Frito-Lay, Inc. Discharge chute with variable slope bottom for fragile article sorting system. 4,889,241, Cl. 209-552.000.

Coghi, Giovanni: *See—*
Scapecchi, Pier L.; Coghi, Giovanni; and Lanati, Paolo, 4,889,086, Cl. 123-90.150.

Cohen, Allen L. Contact lens with cosmetic pattern. 4,889,421, Cl. 351-162.000.

Cohen, William, to M. G. H. Automation Systems. Nest trap for laying hens. 4,889,076, Cl. 119-50.000.

Coleman, Billy M.: *See—*
Bean, Donald E.; and Coleman, Billy M., 4,890,105, Cl. 341-116.000.

Coleman Outdoor Products, Inc.: *See—*
Steffes, William J., 4,889,257, Cl. 220-331.000.

Colgate-Palmolive Company: *See—*
Ahmed, Fahim U.; and Buck, Charles E., 4,889,653, Cl. 252-99.000.
Broze, Guy, 4,889,651, Cl. 252-95.000.
Gaffar, Abdul; Lau, Shek-Hong H.; Afflito, John; and Nykvist, Arline M., 4,889,712, Cl. 424-52.000.
Gaffar, Abdul; and Polefka, Thomas G., 4,889,713, Cl. 424-52.000.
Sullivan, James J.; and Dixit, Nagaraj S., 4,889,652, Cl. 252-99.000.

Colin, Michel: *See—*
Shroot, Braham; Lang, Gerard; Maignan, Jean; Restle , Serge; Hensby, Christopher; and Colin, Michel, 4,889,865, Cl. 514-332.000.

Collett, Kenneth L. High impact resistant carbide tip for a circular saw. 4,889,025, Cl. 83-835.000.

Collette, Wayne N.; and Krishnakumar, Suppayan M., to Continental PET Technologies, Inc. Plastic container, preform for and method of making same. 4,889,247, Cl. 215-1.00C.

Collier, Charles A.: *See—*
Rockom, John W.; and Collier, Charles A., 4,889,252, Cl. 220-3.100.

Comdisco Resources, Inc.: *See—*
Hanson, Merle E.; and Thorson, Lewis D., 4,889,186, Cl. 166-252.000.

Comley, Peter N., to Murdock, Inc. Heater for superplastic forming of metals. 4,888,973, Cl. 72-342.000.

Commissariat A l'Energie Atomique: *See—*
Clerc, Jean-Frederic; Deutsch, Jean-Claude; Vaudaine, Pierre; and Vey, Sylvie, 4,889,412, Cl. 350-347.00E.
Genies, Eugene, 4,889,659, Cl. 252-500.000.

Commissiriat a L'Energie Atomique: *See—*
Jeuch, Pierre, 4,889,828, Cl. 437-34.000.

Computer Design Ranges, Inc.: *See—*
Destry, Donald M.; and Destry, Christopher M., 4,889,346, Cl. 273-406.000.

Conant, John P.: *See—*
Forsyth, John L.; and Conant, John P., 4,889,438, Cl. 400-320.000.

Concord Industries, Inc.: *See—*
Burns, Russell W., 4,889,321, Cl. 254-332.000.

Concrete Technology Corporation: *See—*
Hodson, Harry, 4,889,428, Cl. 366-1.000.

Conley, Peter L.: *See—*
Bohner, John J.; and Conley, Peter L., 4,890,027, Cl. 310-328.000.

Connell, John W.: *See—*
Hergenrother, Paul M.; Connell, John W.; and Havens, Stephen J., 4,889,912, Cl. 528-125.000.

Connolly, John F.; and Thrash, Robert J., to Amoco Corporation. Lithium-sulfur dioxide electrochemical cell with an iodine-catalyzed cathode. 4,889,779, Cl. 429-196.000.

Connolly, Joseph; Holt, Neil L.; Richardson, Anthony R. W.; and Siedenburg, Jay, to Raychem Corporation. Solder delivery device. 4,889,506, Cl. 439-874.000.

Conoco Inc.: *See—*
Hudgins, Roger L.; and Hawkins, Steven E., 4,889,639, Cl. 210-739.000.
Meier, Patricia A.; Meier, W. Jeff; and Woodland, Brent J., 4,889,600, Cl. 203-2.000.

Conrad, George R., to General Electric Company. Beverage container and dispenser. 4,889,261, Cl. 222-130.000.

Contempo Products, P. Herrli: *See—*
Herrli, Peter, 4,889,527, Cl. 604-29.000.

Continental Engineering Co., Inc.: *See—*
Man, Henry H., 4,889,040, Cl. 98-121.200.

Continental PET Technologies, Inc.: *See—*
Collette, Wayne N.; and Krishnakumar, Suppayan M., 4,889,247, Cl. 215-1.00C.

Conway, David W., to Norand Corporation. Universal power supply, independent converter stages for respective hardware components of a computerized system. 4,890,217, Cl. 363-143.000.

Cook, Jeffrey T.: *See—*
Schoggen, Howard L.; Cook, Jeffrey T.; and Bourbon, Robert M., 4,889,596, Cl. 162-157.600.

Cook, Sherry A.; Gerstle, Patrick J.; Smith, David R.; and Stilz, Kathryn R., to International Business Machines Corporation. Automatic page end feature for an electronic typewriter. 4,889,439, Cl. 400-706.000.

Cooley, Bradford S., to Aristacom International, Inc. Clock disabling circuit. 4,890,254, Cl. 364-900.000.

Cooper, William J.: *See—*
Baker, Daniel G.; Cooper, William J.; and Penney, Bruce J., 4,890,158, Cl. 358-10.000.

Copytele, Inc.: *See—*
DiSanto, Frank J.; Krusos, Denis A.; and Schubert, Frederic E., 4,889,603, Cl. 204-180.100.

Cordan, Ernest W., Jr.: *See—*
Neudeck, Alexander J.; and Cordan, Ernest W., Jr., 4,890,010, Cl. 307-270.000.

Cornelissen, Andreas H. W. M., to Instituut Voor Bewaring en Verwerking Van Landbouwprodukten. Device for peeling onions or other bulbous or tuberous plants. 4,889,046, Cl. 99-546.000.

Cornelius, Billie G. Hand-held suction dredge and metal detector. 4,889,391, Cl. 299-9.000.

Cornell Research Foundation, Inc.: *See—*
Timmons, Michael B.; and Kreher, Neal B., 4,889,741, Cl. 426-614.000.

Corning Incorporated: *See—*
Bhagavatula, Venkata A.; and Charlton, David E., 4,889,404, Cl. 350-96.160.

Cosmetic Production: *See—*
Vola, Jean-Jacques, 4,889,254, Cl. 220-23.400.

Cosner, Lane W., to Hughes Aircraft Company. Multiple exposure hologram for minimizing crosstalk. 4,889,780, Cl. 430-1.000.

Cottenceau, Remi; and Zurcher, Erwin, to Mesdan S.p.A. Apparatus for loosening and unravelling a yarn. 4,888,943, Cl. 57-22.000.

Cottingham, Auburn B., deceased: *See—*
Chernega, John G.; Martens, John A.; Olsen, Roger A.; and Cottingham, Auburn B., deceased, 4,889,895, Cl. 525-278.000.

Cottingham, Sue E., administrator: *See—*
Chernega, John G.; Martens, John A.; Olsen, Roger A.; and Cottingham, Auburn B., deceased, 4,889,895, Cl. 525-278.000.

Council of Scientific & Industrial Research: *See—*
Khan, M. M. Taqui; and Bhardwaj, R. Chandra, 4,889,604, Cl. 204-157.500.

Couture, Raymond. Beam structure. 4,888,934, Cl. 52-807.000.

Covington, Anne E.; Hunter, Thomas A.; and Dawes, Keith, to Raychem Corporation. Barrier material for gel sealant-cable jacket interface. 4,889,717, Cl. 428-304.400.

Cox, Jimmy A.; and Wilson, Ian L., to Westinghouse Electric Corp. Method and apparatus for producing turbine blade roots. 4,888,863, Cl. 29-156.80B.

Cox, Karen L.: *See—*
Birmingham, Virginia A.; Cox, Karen L.; and Seno, Eugene T., 4,889,809, Cl. 435-252.300.

Cox, Larry R.: *See—*
Russell, Ronald W.; and Cox, Larry R., 4,888,854, Cl. 16-266.000.

Crack, David J., to Morse Controls Limited. Remote control mechanisms. 4,889,005, Cl. 74-501.600.

Cramer, Claus: *See—*
Seibert, Rudolf; and Cramer, Claus, 4,890,003, Cl. 307-66.000.

Crane, Barry C.: *See—*
Markle, David R.; Crane, Barry C.; and Irvine, Michael P., 4,889,407, Cl. 350-96.290.

Crane, Jack W., to Ford New Holland, Inc. Belt driven disc cutterbar. 4,888,939, Cl. 56-13.600.

Crane, Robert A.; and Morse, Harrod W., to GTE Products Corporation. Building entrance terminal. 4,890,318, Cl. 379-399.000.

Crawford, Clayton C.: *See—*
Brauer, Melvin; and Crawford, Clayton C., 4,889,915, Cl. 525-458.000.

Crews, Gary A.; and Martinez, David R., to Atlantic Richfield Company. Seismic exploration method and apparatus for cancelling non-uniformly distributed noise. 4,890,264, Cl. 367-45.000.

Crinos Industria Farmacobiologica Spa.: *See—*
Gazzani, Giovanni, 4,889,843, Cl. 514-54.000.

Crosby, Robert A., to Amoco Corporation. Housing for the output coupler of a laser. 4,890,296, Cl. 372-107.000.

Cross, Dee L., to Clemson University. Method for treating hays, grains & silages. 4,889,732, Cl. 426-319.000.

Crossan, Jimmey; Maynard, Buford; and Tew, Dennis, to Florida Rock Industries, Inc. Brake and clutch hub. 4,889,214, Cl. 192-17.00R.

Crossley, Roger, to John Wyeth & Brother Limited. 3-(2,5-disubstituted phenylazo)-4-substituted phenylalkan-1-oic acids and esters thereof and method of treating inflammatory disorders therewith. 4,889,846, Cl. 514-150.000.

Crouser, Darwin S.; and Weber, Vincent L., to Hoover Company, The. Brush mounting arrangement. 4,888,851, Cl. 15-371.000.

Crozier, David W.: *See—*
Prior, William C.; Ellis, III: George S.; and Crozier, David W., 4,889,623, Cl. 210-190.000.

Cruess, Michael W.; Moyer, William C.; and Zolnowsky, John, to Motorola, Inc. Paged memory management unit which evaluates access permissions when creating translator. 4,890,223, Cl. 364-200.000.

Cselt - Centro Studi E Laboratori Telecomunicazioni S.P.A.: *See—*
Balboni, Gian P.; Giandonato, Giuseppe; Melen, Riccardo; and Vercellone, Vinicio, 4,890,281, Cl. 370-60.000.

Cullum, Leonard R.: *See—*
Menown, Hugh; Baker, Robert E.; and Cullum, Leonard R., 4,890,034, Cl. 313-595.000.

Cumberland, Glenn W., to Foot Technology, Inc. Method and apparatus for molding shoe inserts. 4,888,841, Cl. 12-38.000.

Cunningham, Linda: *See—*
Adams, Brian; and Cunningham, Linda, 4,889,145, Cl. 131-365.000.

Curtis, George S., to Hewlett-Packard Company. Signal generator utilizing a combined phase locked and frequency locked loop. 4,890,071, Cl. 331-11.000.

Curtis, John M. Test specimen grip apparatus. 4,888,995, Cl. 73-859.000.

Custom Machinery Design, Inc.: *See—*
Gietman, Peter J., Jr., 4,889,522, Cl. 493-193.000.

Daenicke, Heinrich: *See—*
Kruger, Volker; and Daenicke, Heinrich, 4,889,195, Cl. 175-107.000.

Daiichi Pure Chemicals Co., Ltd.: *See—*
Ushizawa, Koji, 4,889,801, Cl. 435-25.000.

Daiken Trade & Industry Co., Ltd.: *See—*
Yoshimi, Satoshi; and Koga, Yoichiro, 4,888,927, Cl. 52-303.000.

Dailey, George F.: *See—*
Jaafar, Hamedo A.; Katzor, Karl A.; Rethage, Wilbert B.; Pompa, Gerard A.; Dailey, George F.; and Guenther, Paul, 4,889,000, Cl. 73-865.800.

Daimler-Benz AG: *See—*
Senft, Ernst; Klemmer, Herbert; Uhl, Ullrich; Naumann, Emil; and Schefcsik, Nikolaus, 4,889,007, Cl. 74-506.000.
Werner, Johannes; Kerschbaum, Walter; and Heinrich, Rolf, 4,889,090, Cl. 123-197.0AC.

Dainippon Pharmaceutical Co., Ltd.: *See—*
Uno, Hitoshi; Kurokawa, Mikio; Sato, Fuminori; Naruto, Shunsuke; and Masuda, Yoshinobu, 4,889,858, Cl. 514-254.000.

Dallas Semiconductor Corporation: *See—*
Little, Wendell L., 4,890,263, Cl. 365-218.000.

Dandridge, Anthony: *See—*
Kersey, Alan D.; and Dandridge, Anthony, 4,889,986, Cl. 250-227.000.

Danico, Kathleen: *See—*
Danico, Richard; and Danico, Kathleen, 4,889,572, Cl. 156-63.000.

Danico, Richard; and Danico, Kathleen. Methods of making tile designs. 4,889,572, Cl. 156-63.000.

Danieli & C. Officine Meccaniche SpA: *See—*
Nigris, Giovanni; and Manera, Roberto, 4,889,178, Cl. 164-448.000.

Daniello, Helene, legal representative: *See—*
Szekely, Ladislau, deceased; and Stieler, Fred, 4,889,555, Cl. 75-0.50R.

Danielsson, Per. Method and a device for deep hole drilling. 4,889,194, Cl. 175-65.000.

D'Antonio, Nicholas F.; and D'Antonio, Nicholas J., to Pfizer Hospital Products Group, Inc. Dry bottle drainage system. 4,889,531, Cl. 604-319.000.

D'Antonio, Nicholas J.: *See—*
D'Antonio, Nicholas F.; and D'Antonio, Nicholas J., 4,889,531, Cl. 604-319.000.

Darley, Henry M., to Texas Instruments Incorporated. Signed digit adder circuit. 4,890,127, Cl. 364-786.000.

Da Silva Telles, Affonso C. S.; and Vaz, Claudio M. Continuous process of optimized fermentation for the production of alcohol. 4,889,805, Cl. 435-161.000.

Datta, Amitava; Davis, Lance A.; DeCristofaro, Nicholas J.; and Marti, Jordi, to Allied-Signal Inc. Amorphous alloys for electromagnetic devices cross reference to related applications. 4,889,568, Cl. 148-108.000.

Davari, Bijan; Ganin, Eti; Harame, David L.; and Sai-Halasz, George A., to International Business Machines Corporation. Method for fabricating shallow junctions by preamorphizing with dopant of same conductivity as substrate. 4,889,819, Cl. 437-27.000.

Dave, Jayant C.; Record, David W.; Nespor, Jill M.; and Hook, Jeffrey S., to Wm. Wrigley Jr. Company. Using cocoa powder to enhance the flavor of a mint flavored chewing gum. 4,889,726, Cl. 426-3.000.

Dave, Jayant C.; Record, David W.; Nespor, Jill M.; and Hook, Jeffrey S., to Wm. Wrigley Jr. Company. Using cocoa powder to enhance the flavor of synthetic chewing gum base. 4,889,727, Cl. 426-3.000.

Davidson, Colin: *See—*
Parker, Alan; and Davidson, Colin, 4,889,563, Cl. 106-287.170.

Davidson, Robert I., to Ethyl Corporation. Perfluoroalkylation process. 4,889,951, Cl. 562-427.000.

Davie, Alan J., to U.S. Philips Corporation. Arrangement for generating a sawtooth current. 4,890,043, Cl. 315-408.000.

Davis, Charles L.: *See*—
Nelson, Craig H.; Dorsett, Thomas J.; and Davis, Charles L., 4,889,133, Cl. 128-681.000.

Davis, Lance A.: *See*—
Datta, Amitava; Davis, Lance A.; DeCristofaro, Nicholas J.; and Marti, Jordi, 4,889,568, Cl. 148-108.000.

Davis, Paul J.; and Porter, Philip, to Unilever Patent Holdings B.V. Process and apparatus for carrying out specific binding assays. 4,889,816, Cl. 436-518.000.

Davis, Roman: *See*—
Pfister, Jurg R.; Davis, Roman; and Lee, Chi-Ho, 4,889,866, Cl. 514-347.000.

Davison, John F.: *See*—
Gradeff, Peter S.; and Davison, John F., 4,889,771, Cl. 428-541.000.

Dawes, Antony J. O.; and Henson, Stephen R., to International Business Machines Corporation. Flexible window management on a computer display. 4,890,098, Cl. 340-721.000.

Dawes, Keith: *See*—
Covington, Anne E.; Hunter, Thomas A.; and Dawes, Keith, 4,889,717, Cl. 428-304.400.

Day, Delbert E.; and Ehrhardt, Gary J., to University of Missouri, The Curators of the. Composition and method for radiation synovectomy of arthritic joints. 4,889,707, Cl. 424-1.100.

Day, Robert A., to United States of America, Energy. Annular array and method of manufacturing same. 4,888,861, Cl. 29-25.350.

Dayley, Kyle E.: *See*—
Willard, Miles J.; Dayley, Kyle E.; Hix, Veldon M.; and Holm, David A., 4,889,733, Cl. 426-438.000.
Willard, Miles J.; Dayley, Kyle E.; Hix, Veldon M.; and Holm, David A., 4,889,737, Cl. 426-550.000.

Dean, Walter L.: *See*—
Herron, Carlisle M.; Dean, Walter L.; Moore, Danny R.; Owens, James W.; and Schoggen, Howard L., 4,889,595, Cl. 162-157.600.

de Andrade Bruning, Inai M. R., to Petroleo Brasileiro S.A. - Petrobras. Process for determining the polarity of a crude oil. 4,889,813, Cl. 436-60.000.

Debaille, Christian: *See*—
Bompard, Bruno; Debaille, Christian; and Bruyere, Alain, 4,889,063, Cl. 112-402.000.

Decker, Arnold F.; and Silke, Timothy L., to Templeton, Kenly & Co. Air speed control valve air pressure drive hydraulic fluid pump. 4,889,472, Cl. 417-46.000.

DeCristofaro, Nicholas J.: *See*—
Datta, Amitava; Davis, Lance A.; DeCristofaro, Nicholas J.; and Marti, Jordi, 4,889,568, Cl. 148-108.000.

Deere & Company: *See*—
Ardueser, William A.; and Anstey, Henry D., 4,889,047, Cl. 100-87.000.
Deutsch, Timothy A., 4,888,940, Cl. 56-16.600.

Dege, Howard C.; and Gilmore, Paul R., to Du Pont de Nemours, E. I., and Company. Swing limit apparatus for cargo box doors. 4,889,372, Cl. 292-218.000.

Degussa Aktiengesellschaft: *See*—
Lotze, Marion; and Kleinschmit, Peter, 4,889,769, Cl. 428-432.000.

Delagi, Richard G.: *See*—
Trenkler, George; Delagi, Richard G.; Padovani, Francois A.; and Winslow, Donald L., 4,890,083, Cl. 335-301.000.

Delahaye, Jean-Yves; and Vinson, Jean-Paul. Test bench for wideband radio link. 4,890,333, Cl. 455-67.000.

Delli-Gatti, Frank A., Jr.: *See*—
Justice, James C.; and Delli-Gatti, Frank A., Jr., 4,889,392, Cl. 299-18.000.

Delphax Systems: *See*—
McCallum, Robert S.; and Hendrikx, Dale E., 4,890,123, Cl. 346-159.000.

DeMayo, Alexander: *See*—
Krygier, S. James; and DeMayo, Alexander, 4,889,491, Cl. 433-136.000.

Dempster, Phlip T.: *See*—
Bond, Malcolm L.; and Dempster, Phlip T., 4,889,108, Cl. 128-25.00R.

Den Boef, Johannes H., to U.S. Philips Corporation. Magnetic resonance imaging apparatus. 4,890,061, Cl. 324-320.000.

Denker, Stanley D., to Doboy Packaging Machinery, Inc. Product alignment device. 4,889,224, Cl. 198-382.000.

Denniston, Donald W. Method and apparatus for forming fibers from thermoplastic materials. 4,889,546, Cl. 65-5.000.

Denny, Ralph E.: *See*—
Fanson, Richard L.; and Denny, Ralph E., 4,888,965, Cl. 68-23.400.

Derer, John L.: *See*—
Shama, Sami A.; and Derer, John L., 4,889,901, Cl. 526-279.000.

DeRome, Raymond D. Apparatus and method for testing, filling and purging closed fluid systems. 4,888,980, Cl. 73-49.200.

de Ronde, Frans C., to National Research Development Corporation. Antenna and waveguide mode converter. 4,890,117, Cl. 343-773.000.

DeRoyal Industries: *See*—
Zachry, Kathy W., 4,889,230, Cl. 206-362.000.

Derryberry, Lesli A.; and Williams, Charles E., to Texas Instruments Incorporated. A chip carrier and mounting structure connected to the chip carrier. 4,890,194, Cl. 361-386.000.

DeSoto, Inc.: *See*—
Shama, Sami A.; and Derer, John L., 4,889,901, Cl. 526-279.000.

Dessart, Herman, to Solvay & Cie. Process for the neutralization of a layer of acidic water over a sediment comprising a humic substance. 4,889,641, Cl. 210-752.000.

Destry, Christopher M.: *See*—
Destry, Donald M.; and Destry, Christopher M., 4,889,346, Cl. 273-406.000.

Destry, Donald M.; and Destry, Christopher M., to Computer Design Ranges, Inc. Automated target range system. 4,889,346, Cl. 273-406.000.

Deutsch, Jean-Claude: *See*—
Clerc, Jean-Frederic; Deutsch, Jean-Claude; Vaudaine, Pierre; and Vey, Sylvie, 4,889,412, Cl. 350-347.00E.

Deutsch, Reinhard, to Korber AG. Apparatus for transferring blockshard groups of rod-shaped articles of the tobacco processing industry. 4,889,226, Cl. 198-450.000.

Deutsch, Timothy A., to Deere & Company. Method and apparatus for compacting cotton within a cotton harvester basket. 4,888,940, Cl. 56-16.600.

Deutsche Gelatinefabriken Stoess & Co. GmbH: *See*—
Muller, Alexander, 4,889,920, Cl. 530-355.000.

Deutsches Electronen-Synchrotron DESY: *See*—
Peters, Jens; and Becker, Ludwig, 4,890,056, Cl. 324-83.00D.

Deverill, Ian: *See*—
Bradwell, Arthur R.; and Deverill, Ian, 4,889,815, Cl. 436-517.000.

Devries, Paul A., to Northern Telecom Limited. Dual-tracking phase-locked loop. 4,890,305, Cl. 375-120.000.

Devtech, Inc.: *See*—
Beck, Martin H., 4,889,752, Cl. 428-36.920.

Dichiara, Peter M., to Digital Equipment Corporation. Cycle counter for timeout microdiagnostics. 4,890,285, Cl. 371-16.200.

Dickey, Steven R.: *See*—
Monslow, H. Vincent; and Dickey, Steven R., 4,890,320, Cl. 380-10.000.

Diesel kiki Co., Ltd.: *See*—
Nakajima, Nobuyuki; Inomata, Kenichi; Moruta, Masaya; Yamaguchi, Toshio; and Eitai, Kazuo, 4,889,474, Cl. 417-295.000.

Dighe, Shyam V., to Westinghouse Electric Corp. Method of recycling steel belted tires. 4,889,556, Cl. 75-10.220.

Digital Equipment Corporation: *See*—
Dichiara, Peter M., 4,890,285, Cl. 371-16.200.
Ellis, Ronald M., Jr.; Wiesler, Oren L.; and Mega, Christopher A., 4,890,225, Cl. 364-200.000.
Felker, Michael A.; Viverito, Angelo N.; Gilstrap, John W.; Martos, Jesus J.; Trujillo, Ruben; and Wang, Chang J., 4,890,278, Cl. 370-17.000.
Gage, Lindsay D., 4,890,221, Cl. 364-200.000.
Hoyte, Lennox P. J.; and Houghton, Christopher L., 4,890,019, Cl. 307-475.000.
Watt, Charles R.; Groll, Frederick K.; and Scaramuzzo, John A., Jr., 4,890,172, Cl. 360-77.040.

Digital Instruments, Inc.: *See*—
Elings, Virgil B.; and Gurley, John A., 4,889,988, Cl. 250-306.000.

Diosady, Levente L.; Rubin, Leon J.; and Tzeng, Yew-Min, to University of Toronto Innovations Foundation, The. Production of rapeseed protein materials. 4,889,921, Cl. 530-377.000.

Dipole Electronics Co., Ltd.: *See*—
Maeno, Yorihiko; and Higashi, Shigeyasu, 4,890,054, Cl. 324-58.50A.

Dipsol Chemicals Co., Ltd.: *See*—
Oshima, Katsuhide; Murai, Toshiaki; Sakurai, Hitoshi; Igarashi, Shuji; Hanagata, Haruo; and Igarashi, Hidesato, 4,889,602, Cl. 204-38.100.

DiSanto, Frank J.; Krusos, Denis A.; and Schubert, Frederic E., to Copytele, Inc. Method of eliminating gas bubbles in an electrophoretic display. 4,889,603, Cl. 204-180.100.

Diversified Investments Corporation: *See*—
Chen, Pao-Chaing, 4,889,335, Cl. 272-73.000.

Dixit, Nagaraj S.: *See*—
Sullivan, James J.; and Dixit, Nagaraj S., 4,889,652, Cl. 252-99.000.

Dixon, Peggy L.; and Schmidt, Christine M., to Dow Corning Corporation. Flowable joint sealant for concrete highway. 4,889,878, Cl. 523-200.000.

Dixon, Rodney G. Electrical junction box installer. 4,888,879, Cl. 33-613.000.

diZerega, Gere S.: *See*—
Sheffield, Warren D.; and diZerega, Gere S., 4,889,722, Cl. 424-450.000.

Djuric, Stevan W.; Shone, Robert L.; and Yu, Stella S. T., to G. D. Searle & Co. Alkoxy-substituted dihydrobenzopyran-2-carboxylate derivatives. 4,889,871, Cl. 514-456.000.

Doboy Packaging Machinery, Inc.: *See*—
Denker, Stanley D., 4,889,224, Cl. 198-382.000.

Dr. Ing. h.c.F. Porsche Aktiengesellschaft: *See*—
von Broock, Ulrich, 4,889,207, Cl. 180-291.000.

Doddrell, David M.; and Irving, Michael G. Method for the determination of iron stores in organic tissue and NMR spectrometer for performing this method. 4,889,125, Cl. 128-653.000.

Doddrell, David M.; and Irving, Michael G. Method for determining the turnover of organic material in living tissue and NMR spectrometer for performing this method. 4,889,126, Cl. 128-653.000.

Doduco KG: *See*—
Prein, Franz; Wiegand, Jurgen; Frey, Peter; and Klink, Norbert, 4,890,035, Cl. 313-633.000.

Dohke, Harumi: *See*—
Izawa, Minoru; Hamamoto, Tadanao; Ishikawa, Masaru; Dohke, Harumi; and Nakano, Tasuku, 4,890,037, Cl. 315-77.000.

Dolivo, Francois B.; and Ungerboeck, Gottfried, to International Business Machines Corporation. Fast timing acquisition for partial-response signalling. 4,890,299, Cl. 375-18.000.

Dolman, Hendrik; and Kuipers, Johannes, to Duphar International Research B.V. New thiazole compounds having fungicidal activity. 4,889,863, Cl. 514-312.000.

Dombay, Zsolt: *See—*
Balogh, Karoly; Dombay, Zsolt; Fodor, Karoly; Grega nee Toth, Erzebet; Lorik, Erno ; Magyar nee Tomorkenyi, Magdolna; Nagy, Jozsef; Pasztor, Karoly; Santha, Pal; Tarpai, Gyula; Toth, Istvan; and Urszin nee Simon, Eszter, 4,889,944, Cl. 558-171.000.

Donahue, William R., Jr., to Emhart Industries, Inc. Method and device for quick connection and disconnection of a solenoid operated valve to a refrigerator with an icemaker. 4,889,316, Cl. 251-129.150.

Door, Robert D.: *See—*
McMichael, James W.; and Door, Robert D., 4,889,577, Cl. 156-281.000.

Doornbos, Tamme S. M.; Haring, Petrus; and Van Der Heijden, Arnoldus, to Lever Brothers Company. Use of diketone precursors in food products. 4,889,736, Cl. 426-536.000.

Dorsett, Thomas J.: *See—*
Nelson, Craig H.; Dorsett, Thomas J.; and Davis, Charles L., 4,889,133, Cl. 128-681.000.

Dougherty, Thomas J.; Potter, William R.; and Weishaupt, Kenneth R., to Health Research, Inc. Apparatus for treatment of tumors. 4,889,129, Cl. 128-664.000.

Douglas, Alan D.: *See—*
Reilly, Kenneth T.; Douglas, Alan D.; and Hoffman, Henry E., 4,889,703, Cl. 423-326.000.

Douglas, Donald L.: *See—*
Lowrance, Dan E.; Douglas, Donald L.; and Merryfield, David W., 4,889,259, Cl. 221-75.000.

Douglas, Johnny H., Jr. Fishing lure with LCD bait. 4,888,904, Cl. 43-17.600.

Douglas, Robert J.: *See—*
Trahan, Albert J.; and Douglas, Robert J., 4,889,549, Cl. 65-314.000.

Dow Chemical Company, The: *See—*
Kosters, Peter H., 4,889,182, Cl. 165-134.100.
McMichael, James W.; and Door, Robert D., 4,889,577, Cl. 156-281.000.

Dow Corning Corporation: *See—*
Brown, Paul L.; and Stickles, David L., 4,889,753, Cl. 428-40.000.
Bujalski, Duane R.; Le Grow, Gary E.; Lipowitz, Jonathan; and Lim, Thomas F., 4,889,899, Cl. 525-479.000.
Burns, Gary T., 4,889,904, Cl. 528-25.000.
Dixon, Peggy L.; and Schmidt, Christine M., 4,889,878, Cl. 523-200.000.
Gutek, Beth I.; and Wright, Antony P., 4,889,942, Cl. 556-419.000.
Kemp, Daniel N., 4,889,668, Cl. 264-40.500.

Dowell Schlumberger Incorporated: *See—*
Parker, Alan; and Davidson, Colin, 4,889,563, Cl. 106-287.170.

Drake, Charles A., to Phillips Petroleum Company. Catalyst compositions useful for olefin isomerization and disproportionation and method for preparing the catalyst compositions. 4,889,840, Cl. 502-255.000.

Drent, Eit, to Shell Oil Company. Polymerization of olefin/CO mixture with catalyst composition comprising phenolic compound. 4,889,913, Cl. 528-392.000.

Dresser Industries, Inc.: *See—*
Woolatt, Derek; and Safford, George J., 4,889,156, Cl. 137-516.130.

Drexler, Jerome; and Bouldin, Eric W., to Drexler Technology Corporation. Method for extending life of optically recorded information. 4,889,979, Cl. 235-454.000.

Drexler Technology Corporation: *See—*
Drexler, Jerome; and Bouldin, Eric W., 4,889,979, Cl. 235-454.000.

Drori, Ze'Ev; and Segal, Moti, to Clifford Electronics, Inc. Multi-channel remote control transmitter. 4,890,108, Cl. 341-176.000.

Drye, James E.; and Post, Steven L., to Motorola Inc. Multichip IC module having coplanar dice and substrate. 4,890,156, Cl. 357-74.000.

DuBois, Donn A., to Shell Oil Company. Preparation of alkyl methacrylate monomers for anionic polymerization. 4,889,900, Cl. 526-77.000.

Dudding, Carl M.: *See—*
Bryan, David E.; Dudding, Carl M.; and Martin, John W., 4,888,990, Cl. 73-326.000.

Dudley, Edgar E. Direct height measuring device for surveying instruments. 4,888,881, Cl. 33-759.000.

Dudley, Roger W. Display device. 4,889,748, Cl. 428-11.000.

Duffalo, Joseph M.; and Lazar, Steven C., Jr., to Motorola Inc. Gallium arsenide power monolithic microwave integrated circuit. 4,890,069, Cl. 330-277.000.

Dugan, Larry M., to Adolph Coors Company. Apparatus for detecting and ejecting bent crowns. 4,889,243, Cl. 209-626.000.

Duinker, Simon, to B. V. Optische Industrie "De Oude Delft" . Piezoelectric attenuation tongue system for slit radiography equipment. 4,890,312, Cl. 378-146.000.

Duke, Ronald J.; and Beery, Jack, to Mead Corporation, The. Apparatus and method for controlling tension in a movable web. 4,889,293, Cl. 242-75.510.

Dull, Dennis C., to General Motors Corporation. Damping assembly for a torque converter clutch. 4,889,012, Cl. 74-730.000.

Dunfield, Lawrence G.; and Lok, Kar P., to BASF Aktiengesellschaft. Profilometry. 4,888,983, Cl. 73-104.000.

Duphar International Research B.V.: *See—*
Dolman, Hendrik; and Kuipers, Johannes, 4,889,863, Cl. 514-312.000.
Hartog, Jan; and Mos, Johannes, 4,889,852, Cl. 514-230.500.
Van Wijngaarden, Ineke; Zwagemakers, Johannes M. A.; and Van Dijk, Jan, 4,889,849, Cl. 514-218.000.

Du Pont de Nemours, E. I., and Company: *See—*
Artz, Steven P., 4,889,550, Cl. 71-86.000.
Burch, Robert R., 4,889,579, Cl. 156-305.000.
Dege, Howard C.; and Gilmore, Paul R., 4,889,372, Cl. 292-218.000.
Gosser, Lawrence W., 4,889,705, Cl. 423-584.000.
Loewe, Erhard; and Bertels, Ludger, 4,889,292, Cl. 242-71.100.
Wu, Chien-Chin, 4,889,862, Cl. 514-311.000.

Durable Pakaging Corporation: *See—*
Ulrich, Lawrence W.; and Lojewski, James R., 4,889,581, Cl. 156-443.000.

Durairaj, Bojayan; Peterson, Alex, Jr.; and Salee, Gideon, to Indspec Chemical Corporation. Novel rubber compounding resorcinolic resins. 4,889,891, Cl. 525-139.000.

Durm, Jurgen: *See—*
Burst, Hermann; Durm, Jurgen; Kretschmer, Helmut; and Schuhmann, Georg, 4,889,382, Cl. 296-180.500.

Dust, Richard A.; and Causton, Peter, to National Starch and Chemical Corporation. Synthetic based cold seal adhesives. 4,889,884, Cl. 524-314.000.

Dutaut, Jean-Michel: *See—*
Benahim, Guy; Dutaut, Jean-Michel; and Giraudon, Jean-Claude, 4,890,070, Cl. 330-296.000.

Duval, Michel: *See—*
Gervais, Pierre; Duval, Michel; and Giroux, Marcel, 4,889,965, Cl. 219-10.55M.

Dynamit Nobel AG: *See—*
Aust, Aloys; Tiroux, Josef; and Weissenfels, Franz, 4,889,875, Cl. 521-123.000.

Dyson, Nicholas J.; Pashby, David P.; and Parke, Judith M., to Amersham International plc. Electrophoresis and transfer for. 4,889,606, Cl. 204-182.800.

E. Beaudrey & Cie: *See—*
Jackson, Philip, 4,889,629, Cl. 210-401.000.

E. D. Bullard Company: *See—*
Oleson, Richard A., 4,888,831, Cl. 2-420.000.

E&E Engineering, Inc.: *See—*
Lutz, Peter J., III, 4,888,926, Cl. 52-291.000.

E. F. Johnson Company: *See—*
Carlson, Jerrold L., 4,889,961, Cl. 29-846.000.

E. R. Squibb & Sons, Inc.: *See—*
Godfrey, Jollie D.; Mueller, Richard H.; and Zahler, Robert, 4,889,930, Cl. 540-363.000.
Haslanger, Martin F.; and Gordon, Eric M., 4,889,874, Cl. 514-575.000.

E Street Enterprises, Inc.: *See—*
Beyer, Michael B., 4,889,250, Cl. 215-228.000.

E-Z Lift Pump, Inc.: *See—*
Krueger, W. E. "Wes" , 4,889,473, Cl. 417-56.000.

Eager, George S., Jr.; Fryszczyn, Bogdan; and Thalmann, Ernest H., to Empire State Electric Energy Research Corporation. Apparatus for use in impregnating electrical cables. 4,888,886, Cl. 34-104.000.

Eagle-Picher Industries, Inc.: *See—*
Beal, Lawrence E., 4,889,146, Cl. 134-64.00R.

Eastman Kodak Company: *See—*
Elwood, James K., 4,889,410, Cl. 350-317.000.
Long, Michael; Palone, Thomas W.; and Kemp, Paul, 4,889,269, Cl. 226-97.000.
Mody, Hemant K., 4,890,129, Cl. 354-234.100.

Ebert, Wolfgang: *See—*
Pielartzik, Harald; Ebert, Wolfgang; Meyer, Rolf-Volker; Traenckner, Hans-Joachim; and Ostlinning, Edgar, 4,889,911, Cl. 528-182.000.

Echols, Robert M.: *See—*
Cogan, Kevin C.; and Echols, Robert M., 4,889,241, Cl. 209-552.000.

Eckert, Horst; Feldmann, Joachim; and Warendorf, Gerhard, to WABCO Westinghouse Fahrzeugbremsen GmbH. Control input device. 4,888,997, Cl. 73-862.650.

Ecklund, Lawrence M.: *See—*
Espe, Roy H.; and Ecklund, Lawrence M., 4,890,072, Cl. 331-11.000.

Eckstein, Gunter K.: *See—*
Segerstrom, Clifford C.; Stil, Jacob H.; Schuurman, Pieter J.; and Eckstein, Gunter K., 4,889,540, Cl. 48-77.000.

Edidin, Michael: *See—*
Packard, Beverly; Edidin, Michael; and Komoriya, Akira, 4,889,916, Cl. 525-54.100.

Edwards, Frank E.; and Wilcken, Stephen W., to Boeing Company, The. Laser alignment system. 4,889,425, Cl. 356-152.000.

Edwards, Lewis M.: *See—*
Kuzyk, Roman; and Edwards, Lewis M., 4,890,131, Cl. 354-299.000.

EG&G Limited: *See—*
Tranter, Brian R., 4,889,350, Cl. 277-88.000.

Egashira, Yoshimi, to Harada Kogyo Kabushiki Kaisha. Antenna for a portable radiotelephone. 4,890,114, Cl. 343-702.000.

Egawa, Akira, to Fanuc Ltd. High frequency power unit for generating gas lasers. 4,890,216, Cl. 363-124.000.

Egawa, Jiro; and Ide, Naoaki, to Kabushiki Kaisha Toshiba. Image forming apparatus for controlling image forming operation in accordance with state of charger. 4,890,125, Cl. 346-160.000.

Eger, David: *See*—
Springthorpe, Anthony J.; Margittai, Agnes; and Eger, David, 4,889,830, Cl. 437-167.000.

Eguchi, Shusaku: *See*—
Kotera, Noboru; Eguchi, Shusaku; and Miura, Norio, 4,889,996, Cl. 250-484.100.

Egyesult Izzolampa es Villamossagi RT: *See*—
Nagy, Gabor; and Neumann, Gyorgy, 4,889,216, Cl. 192-48.400.

Ehemann, Leo: *See*—
Schuster, Ludwig; Hettche, Albert; Liedy, Werner; Weiss, Stefan; and Ehemann, Leo, 4,889,897, Cl. 525-388.000.

Ehrhardt, Gary J.: *See*—
Day, Delbert E.; and Ehrhardt, Gary J., 4,889,707, Cl. 424-1.100.

Ehrhardt, Heinz; Mildenberger, Hilmar; Maier, Thomas; Schaller, Rainer; Sachse, Burkhard; and Braun, Peter, to Hoechst Aktiengesellschaft. Carbamoylimidazole derivatives and their use as fungicides. 4,889,864, Cl. 514-326.000.

EIC Laboratories, Inc.: *See*—
Rauh, R. David; and Goldner, Ronald B., 4,889,414, Cl. 350-357.000.

Eickelmann, Lothar, to Hageag Holding Inc. Electrical circuit for selectively activating electrical devices. 4,890,001, Cl. 307-38.000.

Eickmann, Guenter, to Pine Instrument Company. Electrode system. 4,889,608, Cl. 204-212.000.

Eistrat, Thomas. Chain saw attachment. 4,888,872, Cl. 30-371.000.

Eitai, Kazuo: *See*—
Nakajima, Nobuyuki; Inomata, Kenichi; Moruta, Masaya; Yamaguchi, Toshio; and Eitai, Kazuo, 4,889,474, Cl. 417-295.000.

Elbaum, Marek; Gutkowicz-Krusin, Dina; and Nowakowski, Jerzy, to Riverside Research Institute. Self referencing ambiguity free holography. 4,889,398, Cl. 350-3.670.

Elcor Corporation: *See*—
Campbell, Roy E.; Wilkinson, John D.; and Hudson, Hank M., 4,889,545, Cl. 62-24.000.

Electric Industry Co., Ltd.: *See*—
Tanoshima, Katsuhide; and Nagasawa, Hikoshi, 4,890,230, Cl. 364-419.000.

Electrovac Fabrikation Ellectrotechnisher Spezialartkel Gesellschaft mbH: *See*—
Bayer, Helmut, 4,889,971, Cl. 219-449.000.

ELF FRANCE Societe Anonyme: *See*—
Aurelle, Yves; Bernasconi, Christian; Besombes-Vailhe, Jean; Julien, Edmond; and Roques, Henri, 4,889,537, Cl. 44-53.000.

Elgue, Jean; Oliveau, Olivier; and Peytavy, Jean-Louis, to Societe Nationale Elf Aquitaine (Production). Process and device for selective extraction of H_2S from an H_2S-containing gas. 4,889,700, Cl. 423-220.000.

Eli Lilly and Company: *See*—
Birmingham, Virginia A.; Cox, Karen L.; and Seno, Eugene T., 4,889,809, Cl. 435-252.300.

Elias, William E.: *See*—
Leyden, Richard N.; Lawrence, Robert; and Elias, William E., 4,889,585, Cl. 156-630.000.

Elings, Virgil B.; and Gurley, John A., to Digital Instruments, Inc. Feedback control for scanning tunnel microscopes. 4,889,988, Cl. 250-306.000.

Elison, Hans-Dieter: *See*—
Friedmann, Oswald; and Elison, Hans-Dieter, 4,889,009, Cl. 74-574.000.

Elizarraraz, Antonio: *See*—
Alcaraz, Alfonso; Aguilar, Gerardo; Gonzalez, Mauricio; and Elizarraraz, Antonio, 4,889,210, Cl. 186-38.000.

Ella, Gregory R. Cooling apparatus for low air loss therapy beds. 4,888,958, Cl. 62-237.000.

Elliott, Graham Mervyn: *See*—
Newcombe-Bond, William J., 4,889,622, Cl. 210-169.000.

Ellis, Chris P.: *See*—
Ellis, John P.; and Ellis, Chris P., 4,889,263, Cl. 222-185.000.

Ellis, III: George S.: *See*—
Prior, William C.; Ellis, III: George S.; and Crozier, David W., 4,889,623, Cl. 210-190.000.

Ellis, John P.; and Ellis, Chris P. Sealed bin container. 4,889,263, Cl. 222-185.000.

Ellis, Ronald M., Jr.; Wiesler, Oren L.; and Mega, Christopher A., to Digital Equipment Corporation. Method and apparatus for branching on the previous state in an interleaved computer program. 4,890,225, Cl. 364-200.000.

El-Megeed, Mohamed E. A.; and Sands, David C., to Research and Development Institute, Inc. at Montana State University. Method and compositions for improving the nutritive value of foods via *Lactobacillus Ferementum*. 4,889,810, Cl. 435-252.900.

El-Rashidy, Ragab, to Gynex, Inc. Dialysate solution containing hydroxypropyl-beta-cyclodextrin and method of using same. 4,889,634, Cl. 210-646.000.

Eltro GmbH: *See*—
Prein, Franz; Wiegand, Jurgen; Frey, Peter; and Klink, Norbert, 4,890,035, Cl. 313-633.000.

Elwood, James K., to Eastman Kodak Company. Magenta filters. 4,889,410, Cl. 350-317.000.

Emerson Electric Co.: *See*—
Hult, David R.; and Young, Jeffrey L., 4,888,849, Cl. 15-327.00F.

Emhart Industries, Inc.: *See*—
Donahue, William R., Jr., 4,889,316, Cl. 251-129.150.
Mandell, Russell F., 4,888,974, Cl. 72-391.000.
Trahan, Albert J.; and Douglas, Robert J., 4,889,549, Cl. 65-314.000.

Empire State Electric Energy Research Corporation: *See*—
Eager, George S., Jr.; Fryszczyn, Bogdan; and Thalmann, Ernest H., 4,888,886, Cl. 34-104.000.

Enatsu, Akira: *See*—
Adaniya, Takeshi; Yamashita, Masaaki; Kubota, Takahiro; Enatsu, Akira; Nikaido, Norio; Miyosawa, Yoshiaki; and Nishimoto, Tadashi, 4,889,775, Cl. 428-62.00B.

Enderle, Eckhard; Kaufmann, Dieter; Muller; and Andrzejewski, Thomas, to Carl-Zeiss-Stiftung, Heidenhein/Brenz, doing business as Carl Zeiss. Articulating head for a coordinate-measuring instrument. 4,888,877, Cl. 33-559.000.

Endo, Hideaki, to Oki Electric Industry, Ltd. Delay circuit device utilizing the Miller effect. 4,890,022, Cl. 307-602.000.

Engelbertsson, Karl-Magnus, to AB Tore J Hedback. Valve assembly. 4,889,163, Cl. 137-625.320.

Engelbrecht, Fillippus T., to Centiforce (Proprietary) Limited. Driving head for line cutting devices. 4,888,871, Cl. 30-276.000.

Engeler, William E.: *See*—
Smith, Lowell S.; Engeler, William E.; and O'Donnell, Matthew, 4,890,268, Cl. 367-138.000.

English, Alan R., to Chevron Research Company. Method of suppressing sodium poisoning of cracking catalysts during fluid catalytic cracking. 4,889,617, Cl. 208-121.000.

English, Donald C.: *See*—
Mason, John Y.; Hicks, Bruce W.; and English, Donald C., 4,889,654, Cl. 252-100.000.

English Electric Valve Company Limited: *See*—
Clark, Graeme L.; and Maitland, Arthur, 4,890,295, Cl. 372-61.000.
Menown, Hugh; Baker, Robert E.; and Cullum, Leonard R., 4,890,034, Cl. 313-595.000.

Enomoto, Yuji: *See*—
Oda, Kengo; Ishii, Tsutomu; Fukushi, Yukiharu; Enomoto, Yuji; Nishida, Makoto; and Hojo, Yoshikata, 4,889,551, Cl. 71-88.000.

Entenmann, Robert: *See*—
Beyer, Hans-Ernst; Bonitz, Jorg; Entenmann, Robert; Forster, Siegmar; Knab, Rochus; Kunzel, Walter; Kugler, Wolfgang; Mahlberg, Alfred; Miller, Bernhard; Philipp, Matthias; Rohde, Siegfried; Unland, Stefan; Viess, Walter; Winter, Herbert; and Zimmermann, Jurgen, 4,889,094, Cl. 123-414.000.

Enzo Biochem, Inc.: *See*—
Rabbani, Elazar, 4,889,798, Cl. 435-6.000.

Erbe, Ehrenfried, to Siemens Aktiengesellschaft. Hearing aid comprising printed circuit board. 4,890,329, Cl. 381-68.700.

Erbe Elektromedizin GmbH: *See*—
Flachenecker, Gerhard; Fastenmeier, Karl; and Lindenmeier, Heinz, 4,890,073, Cl. 331-55.000.

Eremity, Frank; and Arway, George, to A. B. Dick Company. Variable orientation ink catcher. 4,890,119, Cl. 346-75.000.

Erico International Corporation: *See*—
Brosnan, Denis A.; Whetsel, James E.; Singer, Richard E.; Samas, Mark V.; Amos, Michael D.; and Kovarik, David P., 4,889,324, Cl. 266-157.000.

Ernst Leitz Wetzlar GmbH: *See*—
Kriegesmann, Jochen; Franek, Henning; and Bluethgen, Waldemar, 4,889,548, Cl. 65-305.000.

Escorp, Inc.: *See*—
Harbers, H. C., Jr., 4,889,981, Cl. 235-490.000.

Espe, Roy H.; and Ecklund, Lawrence M., to Motorola, Inc. Phase locked loop having a fast lock current reduction and clamping circuit. 4,890,072, Cl. 331-11.000.

Esser, Wolfgang; and Jung, Peter, to Nixdorf Computer AG. Circuit arrangement for automatically monitoring several analog electric signals. 4,890,095, Cl. 340-657.000.

Establissements Georges Olivier S.A.: *See*—
Varin, Michel, 4,888,852, Cl. 15-400.000.

Establissements Mesnel: *See*—
Mesnel, Francois; and Mesnel, Gerard, 4,888,917, Cl. 49-479.000.

Eszakmagyarorszagi Vegyimuvek: *See*—
Balogh, Karoly; Dombay, Zsolt; Fodor, Karoly; Grega nee Toth, Erzebet; Lorik, Erno ; Magyar nee Tomorkenyi, Magdolna; Nagy, Jozsef; Pasztor, Karoly; Santha, Pal; Tarpai, Gyula; Toth, Istvan; and Urszin nee Simon, Eszter, 4,889,944, Cl. 558-171.000.

ETA S.A. Fabriques d'Ebauches: *See*—
Nicolet, Richard; and Koch, Daniel, 4,890,111, Cl. 342-51.000.

Ethicon, Inc.: *See*—
Jamiolkowski, Dennis D.; Gaterud, Mark T.; Newman, Hugh D., Jr.; and Shalaby, Shalaby W., 4,889,119, Cl. 606-220.000.
Sheffield, Warren D.; and diZerega, Gere S., 4,889,722, Cl. 424-450.000.

Ethyl Corporation: *See*—
Davidson, Robert I., 4,889,951, Cl. 562-427.000.
Laurenzo, Kathleen S.; and Bauer, Dennis P., 4,889,954, Cl. 564-298.000.
Ranken, Paul F., 4,889,955, Cl. 564-440.000.

ETI Explosives Technologies International (Canada), Ltd.: *See*—
Leong, Dennis Y., 4,889,570, Cl. 149-7.000.

Ettehadieh, Bozorg, to Westinghouse Electric Corp. Web for rotary combustor. 4,889,060, Cl. 110-246.000.

Ettehadieh, Bozorg: *See*—
Yang, Wen-Ching; Lee, Suh Y.; and Ettehadieh, Bozorg, 4,889,058, Cl. 110-214.000.

Eue, Ludwig: *See—*
Forster, Heinz; Eue, Ludwig; Schmidt, Robert R.; and Lurssen, Klaus, 4,889,946, Cl. 560-21.000.
Euler, James A., to Rubiyat Software, Inc. Method for compressing data. 4,890,326, Cl. 381-35.000.
Euromaski OY: *See—*
Hakala, Timo; and Lehtonen, Reijo, 4,888,825, Cl. 2-8.000.
Evans, Michael W.: *See—*
Hendixen, Arne B.; Bowen, William A.; Evans, Michael W.; Hurley, John J.; and Leslie, Samuel A., 4,890,315, Cl. 379-59.000.
Evarts, Gerald L.: *See—*
Campbell, Donald H.; and Evarts, Gerald L., 4,889,773, Cl. 428-552.000.
Ewing, Lloyd: *See—*
Schmit, Frank L.; Redmon, David T.; and Ewing, Lloyd, 4,889,620, Cl. 210-137.000.
Ewing, William S.: *See—*
Kerr, Paul R.; Pettit, Paul H., Jr.; and Ewing, William S., 4,889,890, Cl. 525-113.000.
Excel Industries, Inc.: *See—*
Frey, Robert A.; Woods, Gail E.; and Schmuck, Leroy C., 4,889,175, Cl. 160-90.000.
F. Oberdorfer GmbH & Co. KG Industriegewebe-Technik: *See—*
Krenkel, Bernhard; and Joos, Heinz, 4,889,674, Cl. 264-130.000.
Fabbiani, Bruno. Security document. 4,889,366, Cl. 283-86.000.
Fairchild Semiconductor Corporation: *See—*
Wu, Ching-An, 4,890,153, Cl. 357-74.000.
Faltermeier, Bernd, to Carl-Zeiss-Stiftung. Microscope photometer tube. 4,889,426, Cl. 356-432.000.
Fan, John C. C.; and Zavracky, Paul M., to Kopin Corporation. High temperature photovoltaic system. 4,889,565, Cl. 136-256.000.
Fan, You-Ling; Stanley, James P.; and Brode, George L., to Union Carbide Chemicals and Plastics Company Inc. Gelable acid viscosifiers. 4,889,887, Cl. 524-510.000.
Fang, Chen C.: *See—*
Parsons, Charles, Jr.; and Fang, Chen C., 4,888,826, Cl. 2-22.000.
Fanson, Richard L.; and Denny, Ralph E., to Whirlpool Corporation. Water diverter for spinning basket of automatic washer. 4,888,965, Cl. 68-23.400.
Fanuc Ltd.: *See—*
Egawa, Akira, 4,890,216, Cl. 363-124.000.
Kurakake, Mitsuo; Otsuka, Shoichi; and Muraoka, Yutaka, 4,890,100, Cl. 340-799.000.
Tanaka, Kunio; and Onishi, Yasushi, 4,890,234, Cl. 364-474.230.
Yamazaki, Etsuo, 4,890,291, Cl. 372-38.000.
Fanuc Ltd: *See—*
Kurakake, Mitsuo; and Sakamoto, Keiji, 4,890,046, Cl. 318-630.000.
Farinacci, Michael F.; and Rowell, William A. Aquarium heater. 4,889,973, Cl. 219-528.000.
Farkas, Richard W.; Rock, David A.; and Anderson, James H., to Fluorocarbon Company, The. Self-regulating heater having a heat tape that stops tracking. 4,889,975, Cl. 219-548.000.
Farmer, Homer H.: *See—*
Rowan, Eugene V.; Karol, Thomas J.; and Farmer, Homer H., 4,889,647, Cl. 252-42.700.
Fassina, Antonio. Pain-relieving composite having a relatively rapid action. 4,889,121, Cl. 128-381.000.
Fast, Jacob. Product identification tag with specialized mounting portion. 4,888,897, Cl. 40-657.000.
Fastenmeier, Karl: *See—*
Flachenecker, Gerhard; Fastenmeier, Karl; and Lindenmeier, Heinz, 4,890,073, Cl. 331-55.000.
Fausett, C. Lovon, Sr. Gooseneck assembly for rock drill and method for inserting friction rock stabilizer. 4,889,191, Cl. 173-1.000.
Feder, Joseph: *See—*
Schaumann, Jon P.; Olander, Jitka V.; Hrakas, Nicholaos K.; and Feder, Joseph, 4,889,922, Cl. 530-413.000.
Federal Industries Industrial Group Inc.: *See—*
Woodward, Steven J., 4,890,266, Cl. 367-99.000.
Feild, Eugene P., to Laminar Fluid Controls, Inc. Multipurpose valve. 4,889,159, Cl. 137-508.000.
Feinwerktechnik Schleicher & Co.: *See—*
Goldhammer, Albert; Schleicher, Hans; Stangenberg, Hartmut; and Gasteier, Rolf, 4,889,291, Cl. 241-167.000.
Feldmann, Joachim: *See—*
Eckert, Horst; Feldmann, Joachim; and Warendorf, Gerhard, 4,888,997, Cl. 73-862.650.
Felix, Ernst, to Zellweger Uster AG. Process and apparatus for production and quality control in multi-spindle textile machines. 4,888,944, Cl. 57-264.000.
Felker, Michael A.; Viverito, Angelo N.; Gilstrap, John W.; Martos, Jesus J.; Trujillo, Ruben; and Wang, Chang J., to Digital Equipment Corporation. Apparatus and method for calibrated monitoring of output voltage levels of local area network communication devices. 4,890,278, Cl. 370-17.000.
Fell, Claude; Pages, Etienne; and Uhlmann, Dominique, to Haemonetics Corporation. Portable centrifuge apparatus. 4,889,524, Cl. 494-12.000.
Fernandez, Angel: *See—*
Pitassi, Vincent E.; and Fernandez, Angel, 4,889,013, Cl. 74-752.00F.
Ferrari, Paolo: *See—*
Bertotti, Franco; Ferrari, Paolo; and Gatti, Maria T., 4,890,149, Cl. 357-48.000.
Fiber-Speed International, Inc.: *See—*
Roy, Paul A., 4,889,575, Cl. 156-189.000.
Fields, Donald L., Jr.; and Grabiak, Raymond C., to Monsanto Company. Amine salts of 1,4,2-oxazaphosholidine-4-acetic acid, 2-alkoxy-2-oxides. 4,889,906, Cl. 558-81.000.
Fin Sports Limited: *See—*
Todd, Barry A. H., 4,889,337, Cl. 273-73.00D.
Fior, Gianni O., to Tegal Corporation. Plasma etch isotropy control. 4,889,588, Cl. 156-643.000.
Firestone, Douglas B. Pipe repair assembly. 4,889,370, Cl. 285-342.000.
Firey, Joseph C. Steady work output rate apparatus for cyclic solid with gas reactors. 4,889,539, Cl. 48-61.000.
Firmenich S.A.: *See—*
Pickenhagen, Wilhelm; and Velluz, Alain, 4,889,735, Cl. 426-536.000.
Firth, William C., Jr., to Union Camp Corporation. Substituted-ammonium humate fluid loss control agents for oil-based drilling muds. 4,889,645, Cl. 252-8.514.
Fischer, Ulf; Schneider, Fernand; and Widmer, Ulrich, to Hoffmann-La Roche Inc. Tricyclic pyridine derivatives. 4,889,848, Cl. 514-212.000.
Fischer, William C.: *See—*
Murphy, Richard D.; and Fischer, William C., 4,890,284, Cl. 371-9.100.
Fisher, Celia E.; and Forfitt, Roy, to Stewart Hughes Limited. Monitoring of foreign object ingestion in engines. 4,888,948, Cl. 60-223.000.
Fisher Controls International, Inc.: *See—*
Rice, Donald D.; Hawkins, James C.; and Hall, Stanley D., 4,889,158, Cl. 137-484.400.
Fisons Corporation: *See—*
Wu, Edwin S.; and Kover, Alexander, 4,889,941, Cl. 549-403.000.
Fitzgerald, Robert: *See—*
Walker, Robert; Fitzgerald, Robert; and Bippus, Hans-Dieter, 4,889,405, Cl. 350-96.210.
Flachenecker, Gerhard; Fastenmeier, Karl; and Lindenmeier, Heinz, to Erbe Elektromedizin GmbH. High frequency generator for use with loads subject to great impedance variations. 4,890,073, Cl. 331-55.000.
Flaugher, David J.: *See—*
Hutcheson, J. Stanford; Lutz, Richard W.; Obrist, Paul A.; Flaugher, David J.; and Watts, Charles E., 4,889,132, Cl. 128-680.000.
Flesher, Robert W.; Berninger, Mark S.; and Blakesley, Robert W., to Life Technologies, Inc. Pop up electrophoresis apparatus and method. 4,889,610, Cl. 204-299.00R.
Fling, Russell T.: *See—*
McNeely, David L.; and Fling, Russell T., 4,890,162, Cl. 358-138.000.
Florida Rock Industries, Inc.: *See—*
Crossan, Jimmey; Maynard, Buford; and Tew, Dennis, 4,889,214, Cl. 192-17.00R.
Flower, Wallace C.; and Thorn, Richard P., to Lord Corporation. Fluid filled vibration isolator. 4,889,325, Cl. 267-140.100.
Fluorocarbon Company, The: *See—*
Farkas, Richard W.; Rock, David A.; and Anderson, James H., 4,889,975, Cl. 219-548.000.
Flynn, Richard M.; and Savu, Patricia M., to Minnesota Mining and Manufacturing Company. Perfluoro(cycloaliphatic methyleneoxyalkylene) carbonyl fluorides and derivatives thereof. 4,889,656, Cl. 252-356.000.
FMC Corporation: *See—*
Lutomski, Kathryn A.; Roush, David M.; and Phillips, Richard B., 4,889,867, Cl. 514-365.000.
Fodor, Karoly: *See—*
Balogh, Karoly; Dombay, Zsolt; Fodor, Karoly; Grega nee Toth, Erzebet; Lorik, Erno ; Magyar nee Tomorkenyi, Magdolna; Nagy, Jozsef; Pasztor, Karoly; Santha, Pal; Tarpai, Gyula; Toth, Istvan; and Urszin nee Simon, Eszter, 4,889,944, Cl. 558-171.000.
Foot Technology, Inc.: *See—*
Cumberland, Glenn W., 4,888,841, Cl. 12-38.000.
Foote, Mark A.; and Carter, Stephen J., to Baxter International Inc. Surgical procedure tray. 4,889,231, Cl. 206-363.000.
Ford, James; and Webb, John, to United Kingdom Atomic Energy Authority. Thermally responsive trigger devices and their use in shut-down devices for nuclear reactors. 4,889,683, Cl. 376-336.000.
Ford Motor Company: *See—*
Rietsch, Donald R., 4,889,003, Cl. 74-339.000.
Strosberg, Gordon G.; Janotik, Adam M.; and Gentle, Derek F., 4,888,919, Cl. 49-502.000.
Ward, Marcus J. S.; and Seymour, Peter J., 4,889,373, Cl. 292-336.300.
Ford New Holland, Inc.: *See—*
Crane, Jack W., 4,888,939, Cl. 56-13.600.
Strong, Russell W.; and van Quekelberghe, Eric P. J., 4,889,517, Cl. 460-66.000.
Forde, Philip L.: *See—*
Tamblyn, Charles C.; and Forde, Philip L., 4,889,381, Cl. 296-98.000.
Forester, David R., to Betz Laboratories, Inc. Methods for retarding coke formation during pyrolytic hydrocarbon processing. 4,889,614, Cl. 208-48.0AA.
Forfitt, Roy: *See—*
Fisher, Celia E.; and Forfitt, Roy, 4,888,948, Cl. 60-223.000.
Forster, Heinz; Eue, Ludwig; Schmidt, Robert R.; and Lurssen, Klaus, to Bayer Aktiengesellschaft. Phenoxybenzoic acid compounds and herbicidal and plant growth regulant compositions. 4,889,946, Cl. 560-21.000.
Forster, Siegmar: *See—*
Beyer, Hans-Ernst; Bonitz, Jorg; Entenmann, Robert; Forster, Siegmar; Knab, Rochus; Kunzel, Walter; Kugler, Wolfgang;

Mahlberg, Alfred; Miller, Bernhard; Philipp, Matthias; Rohde, Siegfried; Unland, Stefan; Viess, Walter; Winter, Herbert; and Zimmermann, Jurgen, 4,889,094, Cl. 123-414.000.

Forsyth, John L.; and Conant, John P., to Sanders, Royden C., Jr. Serial printer carriage drive with ballistic rebound reversal. 4,889,438, Cl. 400-320.000.

Foster, Stephen R.; and Oschmann, Thomas R. Wringer device. 4,889,049, Cl. 100-171.000.

Fowles, Thomas A., to Baxter International Inc. Port and elastic closure. 4,889,256, Cl. 220-306.000.

Fraioli, Joseph. Infrared wok heater. 4,889,103, Cl. 126-92.0AC.

Franek, Henning: *See*—
Kriegesmann, Jochen; Franek, Henning; and Bluethgen, Waldemar, 4,889,548, Cl. 65-305.000.

Frank, Gunter: *See*—
Auding, Hans; Frank, Gunter; Kostlin, Heiner; and Vitt, Bruno, 4,889,974, Cl. 219-543.000.

Franke, Harry: *See*—
Wortberg, Johannes; Junk, Paul B.; and Franke, Harry, 4,889,477, Cl. 425-133.100.

Franke, Joachim; Goyert, Wilhelm; and Kipphardt, Helmut, to Bayer Aktiengesellschaft. Polyethers and their use as mold release agents for plastics. 4,889,908, Cl. 521-115.000.

Frantz, Douglas C., to Chrysler Motors Corporation. Method of disabling a resume switch in an electronic speed control system for vehicles. 4,890,231, Cl. 364-426.040.

Frass, Hans W.: *See*—
Stahlhofen, Paul; and Frass, Hans W., 4,889,788, Cl. 430-191.000.

Fred Hutchinson Cancer Research Center: *See*—
Henikoff, Steven; and Gelinas, Richard E., 4,889,799, Cl. 435-6.000.

Freedman, Herb, to Selectrons Ltd. Electrical apparatus with reverse audible alarm. 4,890,215, Cl. 363-63.000.

Freeman, George V.; and Freeman, Roland T. Bow facing rowing system. 4,889,508, Cl. 440-103.000.

Freeman, Roland T.: *See*—
Freeman, George V.; and Freeman, Roland T., 4,889,508, Cl. 440-103.000.

Fremont, Michael J., to Hewlett-Packard Company. Method and apparatus for fault tolerant communication within a computing system. 4,890,224, Cl. 364-200.000.

French, Kendrick L.; and Laney, Mark C., to K. W. Thompson Tool Co., Inc. Firearm. 4,888,901, Cl. 42-51.000.

Frey, Peter: *See*—
Prein, Franz; Wiegand, Jurgen; Frey, Peter; and Klink, Norbert, 4,890,035, Cl. 313-633.000.

Frey, Robert A.; Woods, Gail E.; and Schmuck, Leroy C., to Excel Industries, Inc. Torque window. 4,889,175, Cl. 160-90.000.

Friedmann, Oswald; and Elison, Hans-Dieter, to LUK Lamellen und Kupplungsbau GmbH. Torque transmitting mechanism. 4,889,009, Cl. 74-574.000.

Friend, John M. K.: *See*—
Beker, Henry J.; Halliden, Paul W.; and Friend, John M. K., 4,890,323, Cl. 380-25.000.

Frito-Lay, Inc.: *See*—
Cogan, Kevin C.; and Echols, Robert M., 4,889,241, Cl. 209-552.000.
Miller, L. Michael, 4,889,367, Cl. 283-88.000.

Frost, Stanley A. Hydraulic seal. 4,889,351, Cl. 277-165.000.

Frost, Terry; Smith, Terry B.; and Vensel, Charles D., to ASC Machine Tools, Inc. Slip sheet removal apparatus. 4,889,463, Cl. 414-416.000.

Fryszczyn, Bogdan: *See*—
Eager, George S., Jr.; Fryszczyn, Bogdan; and Thalmann, Ernest H., 4,888,886, Cl. 34-104.000.

Fuchs, Hugo; Ritz, Josef; Thomas, Erwin; and Weiss, Franz-Josef, to BASF Aktiengesellschaft. Preparation of hydroxylammonium salts. 4,889,704, Cl. 423-387.000.

Fuhrer, Walter: *See*—
Buhlmayer, Peter; Stanton, James L.; Fuhrer, Walter; Goschke, Richard; Rasetti, Vittorio; and Rueger, Heinrich, 4,889,869, Cl. 514-400.000.

Fuierer, Anton A.: *See*—
Wachter, William J.; and Fuierer, Anton A., 4,889,681, Cl. 376-272.000.

Fuji Chemicals Industrial Co., Ltd : *See*—
Kaifu, Katsuaki; Kosuge, Maki; Yamashita, Yoshio; Asano, takateru; and Kobayashi, Kenji, 4,889,795, Cl. 430-326.000.

Fuji Electric Co., Ltd.: *See*—
Fujita, Michiru, 4,890,082, Cl. 335-301.000.

Fuji Jukogyo Kabushiki Kaisha: *See*—
Sogawa, Yoshiyuki, 4,889,095, Cl. 123-418.000.

Fuji Photo Film Co., Ltd.: *See*—
Amano, Yoshikazu; Kageyama, Shigeki; and Katsuyama, Harumi, 4,889,797, Cl. 435-4.000.
Hosoi, Yuichi; and Miyahara, Junji, 4,889,990, Cl. 250-327.200.
Ikegawa, Akihiko; Ohashi, Yuichi; and Okazaki, Masaki, 4,889,796, Cl. 430-549.000.
Kikuchi, Yasushi; and Matsuzawa, Hideki, 4,889,564, Cl. 134-21.000.
Kurokawa, Toshio, 4,889,271, Cl. 226-186.000.
Takahashi, Ryuichi, 4,889,786, Cl. 430-138.000.
Takei, Hisashi; Ohmura, Hiroshi; Ushiro, Seimei; Mochida, Mitsuyoshi; Nakamura, Yoshihiko; Asano, Seiji; and Yoshida, Toshio, 4,890,130, Cl. 354-288.000.
Terahata, Masahiro, 4,889,794, Cl. 430-293.000.
Torii, Shumpeita, 4,889,233, Cl. 206-455.000.
Watanabe, Izumi; and Yamana, Keiichi, 4,889,296, Cl. 242-199.000.
Yoshimura, Ryoichi; Torii, Shumpeita; and Yamada, Naoto, 4,889,989, Cl. 250-327.200.

Fuji Xerox Co., Ltd.: *See*—
Akasaki, Yutaka; Tokita, Akihiko; Torikoshi, Kaoru; Imai, Akira; and Ishii, Touru, 4,889,924, Cl. 534-658.000.

Fujii, Toshio: *See*—
Ishii, Kazuaki; Futatsugi, Toshiro; Oshima, Toshio; Fujii, Toshio; Yokoyama, Naoki; and Shibatomi, Akihiro, 4,889,831, Cl. 437-184.000.

Fujikawa, Junichi: *See*—
Taniguchi, Masaharu; Tokunow, Masazumi; and Fujikawa, Junichi, 4,889,793, Cl. 430-284.000.

Fujikawa, Shouji; Araki, Masakatsu; Kumano, Fumihiro; and Tsujimura, Shinichirou, to Matsushita Electric Works, Ltd. Hair trimmer. 4,888,870, Cl. 30-233.500.

Fujikawa, Tetsuzo; Hirata, Makizo; and Tamba, Shinichi, to Kawasaki Jukogyo Kabushiki Kaisha. Work vehicle. 4,889,089, Cl. 123-195.0HC.

Fujimoto, Megumi: *See*—
Usuki, Arimitsu; Mizutani, Tadashi; Fukushima, Yoshiaki; Fujimoto, Megumi; Fukumori, Kenzo; Kojima, Yoshitsugu; Sato, Norio; Kurauchi, Toshio; and Kamigaito, Osami, 4,889,885, Cl. 524-445.000.

Fujimoto, Tadayuki: *See*—
Onishi, Masayoshi; and Fujimoto, Tadayuki, 4,889,033, Cl. 91-6.000.

Fujinami, Hiroshi: *See*—
Takanabe, Kazunori; Yamamoto, Masaki; Ito, Kenzo; and Fujinami, Hiroshi, 4,890,104, Cl. 340-995.000.

Fujino, Akihiko; Ootsuka, Hiroshi; and Izumi, Tatsuro, to Minolta Camera Kabushiki Kaisha. Photographic information setting device for a camera. 4,890,134, Cl. 354-442.000.

Fujioka, Hideaki: *See*—
Nishiyama, Yukinori; Fujioka, Hideaki; Yamaguchi, Hisaaki; Ikeda, Toshiki; and Miyoshi, Keisuke, 4,889,093, Cl. 123-400.000.

Fujisawa Pharmaceutical Co, Ltd.: *See*—
Oku, Teruo; Todo, Eishiro; Kasahara, Chiyoshi; Nakamura, Katsuya; and Kayakiri, Hiroshi, 4,889,851, Cl. 514-223.200.
Ueda, Yoshio; Asakura, Sotoo; Murakami, Yoshio; and Nakate, Toshiomi, 4,889,721, Cl. 424-448.000.

Fujishima, Kazuyasu: *See*—
Hidaka, Hideto; Fujishima, Kazuyasu; and Matsuda, Yoshio, 4,890,261, Cl. 365-73.000.

Fujita, Michiru, to Fuji Electric Co., Ltd. Coil for generating a homogeneous magnetic field. 4,890,082, Cl. 335-301.000.

Fujita, Tomohiro; and Kawano, Ryuji, to Akebono Brake Industry Co., Ltd. Anti-lock control apparatus for air over hydraulic brake system. 4,889,395, Cl. 303-115.000.

Fujitsu Limited: *See*—
Fukushi, Isao; and Muroi, Takahisa, 4,890,018, Cl. 307-446.000.
Ichihara, Junichi, 4,890,178, Cl. 360-114.000.
Ishii, Kazuaki; Futatsugi, Toshiro; Oshima, Toshio; Fujii, Toshio; Yokoyama, Naoki; and Shibatomi, Akihiro, 4,889,831, Cl. 437-184.000.
Itoh, Sumio, 4,890,226, Cl. 364-200.000.
Kawai, Shinichi, 4,889,829, Cl. 437-69.000.
Mori, Haruhisa, 4,889,820, Cl. 437-29.000.
Takei, Akira; Nabeta, Teruyuki; Nishikawa, Tetsuo; and Nagai, Eiichi, 4,890,164, Cl. 358-213.190.
Taniguchi, Tomohiko; Iseda, Kohei; Okazaki, Koji; Amano, Fumio; and Unagami, Shigeyuki, 4,890,325, Cl. 381-34.000.
Utsumi, Kenichi; Yuasa, Tetsuya; Goto, Yasuyuki; Tsugawa, Iwao; and Koshino, Nagaaki, 4,889,746, Cl. 427-162.000.

Fujitsu VLSI Limited: *See*—
Fukushi, Isao; and Muroi, Takahisa, 4,890,018, Cl. 307-446.000.

Fujiwara, Tadayoshi; Yamaoka, Yukio; Hamada, Kazuichi; Yamada, Yoshiro; Kawaguchi, Yasunobu; Oki, Yasuhiro; Taniguchi, Takashi; and Takahashi, Hiroyuki, to Kabushiki Kaisha Kobe Seiko; and Shinko Kosen Kogyo Kabushiki. High strength and high toughness steel bar, rod and wire and the process of producing the same. 4,889,567, Cl. 148-12.00B.

Fujiyoshi, Yoshihiro: *See*—
Yagi, Toru; Fujiyoshi, Yoshihiro; Aoki, Takatoshi; and Urata, Yasuhiro, 4,889,085, Cl. 123-90.120.

Fukayama, Yukio; Oshima, Taku; and Kawano, Shigeyoshi, to Babcock-Hitachi Kabushiki Kaisha. Apparatus for controlling boiler/turbine plant. 4,888,953, Cl. 60-657.000.

Fukizawa, Kazunori; Ohshima, Toyoko; and Hata, Toshinobu, to Honda Giken Kogyo Kabushiki Kaisha. Carbon-fiber-reinforced metallic material and method of producing the same. 4,889,774, Cl. 428-614.000.

Fukumori, Kenzo: *See*—
Usuki, Arimitsu; Mizutani, Tadashi; Fukushima, Yoshiaki; Fujimoto, Megumi; Fukumori, Kenzo; Kojima, Yoshitsugu; Sato, Norio; Kurauchi, Toshio; and Kamigaito, Osami, 4,889,885, Cl. 524-445.000.

Fukuse, Michiyo: *See*—
Maeda, Masao; Fukuse, Michiyo; Miyaaki, Tohru; and Miyake, Toshio, 4,889,728, Cl. 426-5.000.

Fukushi, Isao; and Muroi, Takahisa, to Fujitsu Limited; and Fujitsu VLSI Limited. Bipolar-complementary metal oxide semiconductor circuit. 4,890,018, Cl. 307-446.000.

Fukushi, Yukiharu: *See*—
Oda, Kengo; Ishii, Tsutomu; Fukushi, Yukiharu; Enomoto, Yuji; Nishida, Makoto; and Hojo, Yoshikata, 4,889,551, Cl. 71-88.000.

Fukushima, Atsuhiko: *See*—
Ando, Hitoshi; Kashiwazaki, Takashi; Hosoi, Masayuki; and Fukushima, Atsuhiko, 4,890,233, Cl. 364-457.000.

Fukushima, Masahito: *See*—
Sasaki, Hideki; Matsuoka, Shigeru; Matsuda, Eiji; Yonenaga, Hitoshi; and Fukushima, Masahito, 4,890,256, Cl. 364-900.000.

Fukushima, Takuo: *See*—
Ogou, Sunoo; Ishii, Shigemichi; Tagomori, Sadaaki; Fukushima, Takuo; and Hayashida, Yasumasa, 4,889,312, Cl. 249-216.000.

Fukushima, Tsutomu; Nakao, Tsugio; Yamashita, Kasane; Komuro, Takao; and Nishi, Katsuhiro, to NKK Corporation; and Kokan Mining Co., Ltd. Method of refining ferrous ion-containing acid solution. 4,889,697, Cl. 423-140.000.

Fukushima, Yoshiaki: *See*—
Usuki, Arimitsu; Mizutani, Tadashi; Fukushima, Yoshiaki; Fujimoto, Megumi; Fukumori, Kenzo; Kojima, Yoshitsugu; Sato, Norio; Kurauchi, Toshio; and Kamigaito, Osami, 4,889,885, Cl. 524-445.000.

Fuller, John; and Gasan, Joseph A., to 501 Reed Tool Co., Ltd. Rotary drill bit for use in drilling holes in subsurface earth formations. 4,889,017, Cl. 76-108.00A.

Fuller, Lance S.: *See*—
Grosvenor, Peter R.; and Fuller, Lance S., 4,889,940, Cl. 549-81.000.

Fuller, Mark; and Robinson, Alan S., to Wet Enterprises, Inc. Apparatus and method for stream diverter. 4,889,283, Cl. 239-11.000.

Fundell, Yngve, to Oy Wartsila AB. Upstreams inclined doctor blade. 4,889,071, Cl. 118-126.000.

Furman, Herbert, to General Motors Corporation. Window retention method. 4,889,574, Cl. 156-108.000.

Furneaux, Robin C.: *See*—
Rigby, William R.; Furneaux, Robin C.; and Thomas, Anthony T., 4,889,631, Cl. 210-493.100.

Furukawa Electric Co., Ltd., The: *See*—
Otsuki, Yasuo; and Nakamura, Yoshio, 4,889,493, Cl. 437-265.000.

Furuya, Kunitaka; and Shibahata, Yasuji, to Honda Giken Kogyo Kabushiki Kaisha. Drive force distribution control system for four-wheel drive motor vehicle. 4,889,204, Cl. 180-197.000.

Furuya, Masato: *See*—
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 4,890,124, Cl. 346-160.000.

Futatsugi, Toshiro: *See*—
Ishii, Kazuaki; Futatsugi, Toshiro; Oshima, Toshio; Fujii, Toshio; Yokoyama, Naoki; and Shibatomi, Akihiro, 4,889,831, Cl. 437-184.000.

G. A. Richards Company: *See*—
Mitchell, Terry L.; Sutton, Fredrick E.; and Sutton, Todd A., 4,889,396, Cl. 312-221.000.

G. D. Searle & Co.: *See*—
Djuric, Stevan W.; Shone, Robert L.; and Yu, Stella S. T., 4,889,871, Cl. 514-456.000.

GAC International, Inc.: *See*—
Iida, Eiji, 4,889,485, Cl. 433-9.000.

Gaddipati, Achuta R.: *See*—
Singh, Raj N.; and Gaddipati, Achuta R., 4,889,686, Cl. 419-13.000.

Gaffar, Abdul; Lau, Shek-Hong H.; Afflito, John; and Nykvist, Arline M., to Colgate-Palmolive Company. Anticalculus oral composition. 4,889,712, Cl. 424-52.000.

Gaffar, Abdul; and Polefka, Thomas G., to Colgate-Palmolive Company. Anticalculus oral compositions. 4,889,713, Cl. 424-52.000.

Gage, Gene F., Sr.; and Spector, George. Self contained collision avoidance light. 4,890,091, Cl. 340-467.000.

Gage, Lindsay D., to Digital Equipment Corporation. Apparatus and method for reconstructing a microstack. 4,890,221, Cl. 364-200.000.

Gagliardi, Richard P., to United States of America, Navy. Lightweight, broadband, pulsed, frequency agile, self-screening jammer for airborne deployment. 4,890,109, Cl. 342-14.000.

Gajewski, Arno: *See*—
Nash, Jakob; and Gajewski, Arno, 4,889,462, Cl. 414-408.000.

Gallagher Limited: *See*—
Adams, Brian; and Cunningham, Linda, 4,889,145, Cl. 131-365.000.

Galline, Yves; and Soria, Claude. Attaching device and tools for positioning same, especially for attaching the trochanter major to the femur. 4,889,110, Cl. 606-69.000.

Galpin, Robert K. P., to Plessey Overseas Limited. Troposcatter modem receiver. 4,890,298, Cl. 375-14.000.

Gals Industries, Inc.: *See*—
Bryan, David E.; Dudding, Carl M.; and Martin, John W., 4,888,990, Cl. 73-326.000.

Gammerler, Hagen. Conveying apparatus for paper products, in particular in stream form. 4,889,333, Cl. 271-272.000.

Ganin, Eti: *See*—
Davari, Bijan; Ganin, Eti; Harame, David L.; and Sai-Halasz, George A., 4,889,819, Cl. 437-27.000.

Gannaway, Edwin L.; and Ortiz, Arturo L., to Tecumseh Products Company. Twin rotary compressor with suction accumulator. 4,889,475, Cl. 417-350.000.

Garagnani, Enea: *See*—
Bassi, Mauro; Garagnani, Enea; and Gorini, Giuseppe, 4,889,888, Cl. 525-75.000.

Garcia, Gilbert C.; and Valdes, Rodolfo G. Cart for positioning a body on a toilet. 4,888,833, Cl. 4-480.000.

Gardiner, Kenneth W.; Hori, Tatsu; and Mangal, Norman F., to Savin Corporation. Photoconductive drum cleaning apparatus. 4,890,135, Cl. 355-299.000.

Garr, Michael M. Enhanced light fishing lure. 4,888,905, Cl. 43-17.600.

Garrett, Robert C.: *See*—
Meredith, Thomas L.; and Garrett, Robert C., 4,888,876, Cl. 33-501.080.

Garsee, Henry A.: *See*—
Sarrine, Robert J.; Garsee, Henry A.; Kelley, Charles D.; and Guadagno, Philip A., 4,890,247, Cl. 364-571.040.

Gas Research Institute: *See*—
Grald, Eric W.; and MacArthur, J. Ward, 4,889,280, Cl. 236-44.00C.

Gasan, Joseph A.: *See*—
Fuller, John; and Gasan, Joseph A., 4,889,017, Cl. 76-108.00A.

Gaskell, David J., to Lucas Industries Public Ltd. Company. Fuel injection nozzle. 4,889,288, Cl. 239-533.500.

Gasteier, Rolf: *See*—
Goldhammer, Albert; Schleicher, Hans; Stangenberg, Hartmut; and Gasteier, Rolf, 4,889,291, Cl. 241-167.000.

Gaterud, Mark T.: *See*—
Jamiolkowski, Dennis D.; Gaterud, Mark T.; Newman, Hugh D., Jr.; and Shalaby, Shalaby W., 4,889,119, Cl. 606-220.000.

Gatti, Maria T.: *See*—
Bertotti, Franco; Ferrari, Paolo; and Gatti, Maria T., 4,890,149, Cl. 357-48.000.

Gavelin, Gunnar, to Mo och Domsjo Aktiebolag. Method for manufacturing filler-containing paper. 4,889,594, Cl. 162-130.000.

Gaz de France: *See*—
Anne, Roland, 4,889,450, Cl. 405-154.000.

Gazzani, Giovanni, to Crinos Industria Farmacobiologica Spa. Salt of trisaccharide, and composition and process for re-stimulating hair growth. 4,889,843, Cl. 514-54.000.

Geary, Earl G., Jr.: *See*—
Buljan, Sergej-Tomislav V.; and Geary, Earl G., Jr., 4,889,836, Cl. 501-97.000.

Gebr. Eickhoff Maschinenfabrik u. EisengieBerei mbH: *See*—
Schupphaus, Herbert, 4,889,393, Cl. 299-42.000.

Geiser, Markus; and Juillerat, Pierre, to Sameca SA. Guide-bar device for a single spindle lathe. 4,889,024, Cl. 82-127.000.

Geist, Jill M.; Messner Scott C.; and Schapira, Thomas G., to Abbott Laboratories. Ion-selective electrode having a non-metal sensing element. 4,889,612, Cl. 204-416.000.

Gelfand, David H.; Stoffel, Susanne; Lawyer, Frances C.; and Saiki, Randall K., to Cetus Corporation. Purified thermostable enzyme. 4,889,818, Cl. 435-194.000.

Gelinas, Richard E.: *See*—
Henikoff, Steven; and Gelinas, Richard E., 4,889,799, Cl. 435-6.000.

General Electric Company: *See*—
Paliga, Bantval J.; and Korman, Charles S., 4,890,143, Cl. 357-23.400.
Billings, David L., 4,889,443, Cl. 403-365.000.
Conrad, George R., 4,889,261, Cl. 222-130.000.
Gou, Perng-Fei; and Wade, Gentry E., 4,889,682, Cl. 376-283.000.
Johansson, Eric B., 4,889,684, Cl. 376-444.000.
Parks, Harold G.; Piper, William W.; Possin, George E.; and Castleberry, Donald E., 4,889,411, Cl. 350-334.000.
Singh, Raj N.; and Gaddipati, Achuta R., 4,889,686, Cl. 419-13.000.
Smith, Lowell S.; Engeler, William E.; and O'Donnell, Matthew, 4,890,268, Cl. 367-138.000.
Witting, Harald L., 4,890,042, Cl. 315-248.000.
Yates, John B., III, 4,889,889, Cl. 525-92.000.

General Electric Company, p.l.c., The: *See*—
Pearce, Timothy H. B., 4,890,107, Cl. 341-156.000.

General Motors Corporation: *See*—
Dull, Dennis C., 4,889,012, Cl. 74-730.000.
Furman, Herbert, 4,889,574, Cl. 156-108.000.
Thompson, Douglas K., 4,888,947, Cl. 60-39.080.

General Signal Corporation: *See*—
Homer, John C., 4,888,989, Cl. 73-304.00C.

Generaldirektoratet for Danske Statsbaner, DSB, and Jens Moller-Jensen: *See*—
Toft, Nils, 4,890,201, Cl. 362-31.000.

Genevieve, Deville, to Thomson-CSF. Lightning protective device for mobile radar antenna. 4,890,189, Cl. 361-222.000.

Genies, Eugene, to Commissariat a L'Energie Atomique. Nitrogenized electronic conductive polymers, their preparation processes, electrochromic display cell and electrochemical generator using these polymers. 4,889,659, Cl. 252-500.000.

Gentle, Derek F.: *See*—
Strosberg, Gordon G.; Janotik, Adam M.; and Gentle, Derek F., 4,888,919, Cl. 49-502.000.

Gentry, Charles B., to Granco-Clark, Inc. Temperature controlled probe assembly. 4,889,483, Cl. 432-49.000.

Geoflow International Pty. Limited: *See*—
Kelsey, Christopher G., 4,889,317, Cl. 251-212.000.

George, Kevin R.: *See*—
Sommers, Kenneth C.; Wesson, David S.; and George, Kevin R., 4,889,183, Cl. 166-55.000.

Gerber, Curtis E. Fruit harvesting machine. 4,888,941, Cl. 56-328.100.

Gerst, Michael: *See*—
Maack, Werner; Gerst, Michael; and Liedloff, Manfred, 4,888,867, Cl. 29-857.000.

Gerstle, Patrick J.: *See*—
Cook, Sherry A.; Gerstle, Patrick J.; Smith, David R.; and Stilz, Kathryn R., 4,889,439, Cl. 400-706.000.

Gerstle, Volker; and Mauz, Gerhard, to Nokia Graetz. Process and apparatus for producing a black matrix layer. 4,889,781, Cl. 430-25.000.

Gervais, Pierre; Duval, Michel; and Giroux, Marcel, to Hydro-Quebec. Microwave drying of the paper insulation of high voltage electrotechnical equipments. 4,889,965, Cl. 219-10.55M.

Geuze, Maarten M.: *See—*
Van Broekhoven, Johannes A. M.; Geuze, Maarten M.; and Salter, James A., 4,889,914, Cl. 528-392.000.

GEZE Sport International GmbH: *See—*
Kowatsch, Ulrich; and Bauer, Heike, 4,889,359, Cl. 280-629.000.

GH International Ltd.: *See—*
Marchant, Ian M., 4,889,282, Cl. 238-347.000.

Giandonato, Giuseppe: *See—*
Balboni, Gian P.; Giandonato, Giuseppe; Melen, Riccardo; and Vercellone, Vinicio, 4,890,281, Cl. 370-60.000.

Giannini, Umberto: *See—*
Canova, Luciano; Giannini, Umberto; Albizzati, Enrico; Borghi, Italo; and Proto, Antonio, 4,889,896, Cl. 525-375.000.

Gibbs, Floyd M. Controlled attractant-discharge mechanism for fishing lures. 4,888,907, Cl. 43-42.060.

Gibson, David E.; and Gibson, Steven D. Trash bag support with collapsible legs. 4,889,300, Cl. 248-97.000.

Gibson, Steven D.: *See—*
Gibson, David E.; and Gibson, Steven D., 4,889,300, Cl. 248-97.000.

Gietman, Peter J., Jr., to Custom Machinery Design, Inc. Rotary bag making machine for drawstring bags. 4,889,522, Cl. 493-193.000.

Gifford, Koger B. Knee separation cushion. 4,889,109, Cl. 128-80.00A.

Gilbarco, Inc.: *See—*
Myers, Howard M., 4,890,210, Cl. 363-21.000.

Gill, David C., to Nomix Manufacturing Company Ltd. Calibration of fluid delivery equipment. 4,889,001, Cl. 73-865.900.

Gillet, Jean-Luc, to Hohe KG. Outside rear-view mirror having a mechanically adjustable mirror glass. 4,889,308, Cl. 248-485.000.

Gilmore, Paul R.: *See—*
Dege, Howard C.; and Gilmore, Paul R., 4,889,372, Cl. 292-218.000.

Gilstrap, John W.: *See—*
Felker, Michael A.; Viverito, Angelo N.; Gilstrap, John W.; Martos, Jesus J.; Trujillo, Ruben; and Wang, Chang J., 4,890,278, Cl. 370-17.000.

Girard, Joel; and Wattebled, Christian, to Vachette. Motorized closing device, particularly for an automotive-vehicle trunk. 4,889,371, Cl. 292-201.000.

Giraudon, Jean-Claude: *See—*
Benahim, Guy; Dutaut, Jean-Michel; and Giraudon, Jean-Claude, 4,890,070, Cl. 330-296.000.

Giroux, Marcel: *See—*
Gervais, Pierre; Duval, Michel; and Giroux, Marcel, 4,889,965, Cl. 219-10.55M.

Glacier Metal Company Limited, The: *See—*
Gojon, Roger L., 4,889,435, Cl. 384-276.000.

Glass, Peter R.: *See—*
Chadwick, Donald T.; and Glass, Peter R., 4,889,385, Cl. 297-302.000.

Glaunes, Andre. Ski-carrying element. 4,889,364, Cl. 280-814.000.

Gleason Reel Corp.: *See—*
Pea, Kevin I.; Tenniswood, David M.; and Loeck, Steven M., 4,889,964, Cl. 200-31.00R.

Gleeson, Robert G.: *See—*
Willer, Rodney L.; Hartwell, James A.; and Gleeson, Robert G., 4,889,571, Cl. 149-19.900.

Glenn, Willis H. Apparatus for bagging hay bales. 4,888,937, Cl. 53-567.000.

Glickman, Joel I.; and Pflug, Robert F., to Trion Industries, Inc. All plastic display hook with locking feature. 4,889,304, Cl. 248-222.100.

Global Designs Inc.: *See—*
St. Denis, Carroll R., 4,889,029, Cl. 84-454.000.

Godfrey, Jollie D.; Mueller, Richard H.; and Zahler, Robert, to E. R. Squibb & Sons, Inc. Process for making 2-oxo-1-((substituted sulfonyl)amino)carbonzyl)azetidines and intermediates used therein. 4,889,930, Cl. 540-363.000.

Gojon, Roger L., to Glacier Metal Company Limited, The. Bearings having upper and lower halves of different materials. 4,889,435, Cl. 384-276.000.

Goldberg, Murrell A.; and Sammons, Jack. Latent ink. 4,889,559, Cl. 106-21.000.

Goldenberg, Shaul, to Goldenberg, Shaul. Tilt slider. 4,888,915, Cl. 49-181.000.

Goldhammer, Albert; Schleicher, Hans; Stangenberg, Hartmut; and Gasteier, Rolf, to Feinwerktechnik Schleicher & Co. Strip-off device for shedding machines with sheet material grid engaging between shredding disks. 4,889,291, Cl. 241-167.000.

Goldner, Ronald B.: *See—*
Rauh, R. David; and Goldner, Ronald B., 4,889,414, Cl. 350-357.000.

Goldstein, Steven G., to Rabbit Systems, Inc. Infra-sonic detector and alarm with self adjusting reference. 4,890,265, Cl. 367-94.000.

Goliard, Francois: *See—*
Charbonnier, Jean; and Goliard, Francois, 4,889,177, Cl. 164-97.000.

Gomez-Estevez, Camilo: *See—*
Villavicencio, Eduardo J.; and Gomez-Estevez, Camilo, 4,889,591, Cl. 162-20.000.

Gomoll, Gunter; and Hauslaib, Wolfgang, to Mannesmann Aktiengesellschaft. Device for the paper transport of single sheets and/or continuous paper in office machines, in particular in matrix printers. 4,889,270, Cl. 226-181.000.

Gonzalez, Mauricio: *See—*
Alcaraz, Alfonso; Aguilar, Gerardo; Gonzalez, Mauricio; and Elizarraraz, Antonio, 4,889,210, Cl. 186-38.000.

Goodman, Robert L.: *See—*
Yuhas, John M.; Goodman, Robert L.; and Moore, Robert E., 4,889,525, Cl. 600-1.000.

Goodnow, Ronald F., to Thermo Electron Web Systems, Inc. Magnetically actuated valve for cyclically operating piston-cylinder actuator. 4,889,035, Cl. 91-275.000.

Goodsell, Roger C.: *See—*
Chenoweth, Vaughn C.; and Goodsell, Roger C., 4,889,764, Cl. 428-283.000.

Goral, Erhard; and Mensing, Walter, to Wabco Westinghouse Fahrzeugbremsen GmbH. Chamber equipped with a breather opening to the atmosphere. 4,889,037, Cl. 92-78.000.

Gordon, Eric M.: *See—*
Haslanger, Martin F.; and Gordon, Eric M., 4,889,874, Cl. 514-575.000.

Gordon, Robert T. Method for the connection of biological structures. 4,889,120, Cl. 606-216.000.

Gorini, Giuseppe: *See—*
Bassi, Mauro; Garagnani, Enea; and Gorini, Giuseppe, 4,889,888, Cl. 525-75.000.

Gorman, Kathleen: *See—*
Simon, James W., Jr.; and Gorman, Kathleen, 4,889,582, Cl. 148-12.70A.

Goschke, Richard: *See—*
Buhlmayer, Peter; Stanton, James L.; Fuhrer, Walter; Goschke, Richard; Rasetti, Vittorio; and Rueger, Heinrich, 4,889,869, Cl. 514-400.000.

Gosser, Lawrence W., to Du Pont de Nemours, E. I., and Company. Hydrogen peroxide method using optimized H+ and BR− concentrations. 4,889,705, Cl. 423-584.000.

Gostelow, Benjamin F., to New World Domestic Appliances Limited. Air extractor arrangements. 4,889,104, Cl. 126-299.00R.

Goto, Hiroyuki: *See—*
Higaki, Yuzo; Goto, Hiroyuki; and Tanikawa, Keiichi, 4,889,648, Cl. 252-49.500.

Goto, Yasuyuki: *See—*
Utsumi, Kenichi; Yuasa, Tetsuya; Goto, Yasuyuki; Tsugawa, Iwao; and Koshino, Nagaki, 4,889,746, Cl. 427-162.000.

Gou, Perng-Fei; and Wade, Gentry E., to General Electric Company. Passive cooling system for nuclear reactor containment structure. 4,889,682, Cl. 376-283.000.

Goyert, Wilhelm: *See—*
Franke, Joachim; Goyert, Wilhelm; and Kipphardt, Helmut, 4,889,908, Cl. 521-115.000.

GPAC, Inc.: *See—*
Natale, Thomas, 4,885,846, Cl. 15-236.010.

Grabiak, Raymond C.: *See—*
Fields, Donald L., Jr.; and Grabiak, Raymond C., 4,889,906, Cl. 558-81.000.

Graco Inc.: *See—*
Hemming, Dale R., 4,890,190, Cl. 361-235.000.

Gradeff, Peter S.; and Davison, John F., to Rhone-Poulenc Inc. Method of preserving wood with lanthanide derivatives. 4,889,771, Cl. 428-541.000.

Graham, Melba T.: *See—*
McMoore, Clarence J., Jr.; and Graham, Melba T., 4,889,295, Cl. 242-118.300.

Graham, Wesley H.; Axter, Sven E.; and Lin, Fu-Shiong, to Boeing Company, The. Lithium bearing alloys free of Luder lines. 4,889,569, Cl. 148-130.000.

Grald, Eric W.; and MacArthur, J. Ward, to Gas Research Institute. Temperature and humidity auctioneering control. 4,889,280, Cl. 236-44.00C.

Granco-Clark, Inc.: *See—*
Gentry, Charles B., 4,889,483, Cl. 432-49.000.

Granville, Andre: *See—*
Lecourt, Jean; Legros, Desire; and Granville, Andre, 4,889,547, Cl. 65-107.000.

Grass Valley Group, Inc.: *See—*
Johnson, Brion; Kesti, Michael R.; and Reynolds, Keith Y., 4,890,163, Cl. 358-181.000.

Graver Company, The: *See—*
Soriente, Alfonse J.; and Gurnari, Lawrence, 4,889,624, Cl. 210-232.000.

Graviner Limited: *See—*
Brown, Alfred R.; and Mackrell, Andrew D., 4,889,994, Cl. 250-374.000.

Greeley, Martin O.: *See—*
Guinn, Perry W.; Mills, Gary N.; Bedient, Robert A.; and Greeley, Martin O., 4,889,812, Cl. 435-289.000.

Green, F. Richard; and Kreimer, Charles C., to Pease Industries, Inc. Fire-resistant door. 4,888,918, Cl. 49-501.000.

Green, Larry A.: *See—*
Chu, Pochen; Green, Larry A.; and Landis, Michael E., 4,889,839, Cl. 502-242.000.

Greene, Michael; and Michlin, Norman, to Michlin Diazo Products. Ventilating system for diazo process printing machines. 4,890,136, Cl. 355-27.000.

Greene, Wilton R. Spherical puzzle. 4,889,340, Cl. 273-153.00S.

Greenwold, Douglas J.; and Reinhold, Herbert E., Jr., to Survival Technology, Inc. Device for measuring multiple channels of heartbeat activity and encoding into a form suitable for simultaneous transmission over. 4,889,134, Cl. 128-696.000.

Grega nee Toth, Erzebet: *See*—
Balogh, Karoly; Dombay, Zsolt; Fodor, Karoly; Grega nee Toth, Erzebet; Lorik, Erno ; Magyar nee Tomorkenyi, Magdolna; Nagy, Jozsef; Pasztor, Karoly; Santha, Pal; Tarpai, Gyula; Toth, Istvan; and Urszin nee Simon, Eszter, 4,889,944, Cl. 558-171.000.
Gregory, Peter G. G. Chair member. 4,889,387, Cl. 297-458.000.
Grenouillet, Pierre; Neibecker, Denis; and Tkatchenko, Igor, to Rhone-Poulenc Chimie. Catalytic (co)dimerization of alkyl acrylates. 4,889,949, Cl. 560-202.000.
Greten GmbH & Co. KG: *See*—
Bartling, Werner; and Jagode, Fritz H., 4,888,884, Cl. 34-32.000.
Griffith, Scott J., to Sun Microsystems. Method and apparatus for measuring the speed of an integrated circuit device. 4,890,270, Cl. 368-113.000.
Grimm, Virgil A. Door stop alarm. 4,890,092, Cl. 340-546.000.
Grisham, C. Lynwood: *See*—
Grisham, Fred A.; and Grisham, C. Lynwood, 4,888,924, Cl. 52-217.000.
Grisham, Fred A.; and Grisham, C. Lynwood. Door frame extension assembly. 4,888,924, Cl. 52-217.000.
Groll, Frederick K.: *See*—
Watt, Charles R.; Groll, Frederick K.; and Scaramuzzo, John A., Jr., 4,890,172, Cl. 360-77.040.
Grosswendt, Werner; and Unterstein, Klaus, to Rheinmetall GmbH. Projectile equipped with deployable parachute. 4,889,030, Cl. 89-1.i40.
Grosswendt, Werner; Unterstein, Klaus; and Simon, Walter, to Rheinmetall GmbH. Projectile equipped with braking parachute. 4,889,053, Cl. 102-348.000.
Grosvenor, Peter R.; and Fuller, Lance S., to Shell Internationale Research Maatschappij B.V. Process for preparing thiophene derivatives. 4,889,940, Cl. 549-81.000.
Gruen, Dieter M.; Young, Charles E.; and Pellin, Michael J., to ARCH Development Corporation. Photo ion spectrometer. 4,889,987, Cl. 250-282.000.
Grumman Allied Industries, Inc.: *See*—
White, David A., 4,889,389, Cl. 297-468.000.
GTE Laboratories Incorporated: *See*—
Buljan, Sergej-Tomislav V.; and Geary, Earl G., Jr., 4,889,836, Cl. 501-97.000.
GTE Products Corporation: *See*—
Crane, Robert A.; and Morse, Harrod W., 4,890,318, Cl. 379-399.000.
Keeffe, William M.; and Krasko, Zeya K., 4,890,030, Cl. 313-25.000.
Reilly, Kenneth T.; Douglas, Alan D.; and Hoffman, Henry E., 4,889,703, Cl. 423-326.000.
Guadagno, Philip A.: *See*—
Sarrine, Robert J.; Garsee, Henry A.; Kelley, Charles D.; and Guadagno, Philip A., 4,890,247, Cl. 364-571.040.
Guagliardo, John L.: *See*—
Pohlmann, Juergen L. W.; Honey, Richard C.; and Guagliardo, John L., 4,890,075, Cl. 330-4.300.
Guardian Industries Corp.: *See*—
Chenoweth, Vaughn C.; and Goodsell, Roger C., 4,889,764, Cl. 428-283.000.
Guenin, Serge: *See*—
Barbier, Rene ; and Guenin, Serge, 4,889,504, Cl. 439-712.000.
Guenther, Paul: *See*—
Jaafar, Hamedo A.; Katzor, Karl A.; Rethage, Wilbert B.; Pompa, Gerard A.; Dailey, George F.; and Guenther, Paul, 4,889,000, Cl. 73-865.800.
Guentner, Herwig, to Siemens Aktiengesellschaft. Digital tachometer with air gap adjusting yoke insertable through holes in the tachometer housing. 4,890,059, Cl. 324-174.000.
Gueret, Jean-Louis, to L'Oreal. Single-use makeup set. 4,889,228, Cl. 206-209.000.
Guinn, Perry W.; Mills, Gary N.; Bedient, Robert A.; and Greeley, Martin O., to C. D. Medical, Inc. Bioreactor apparatus. 4,889,812, Cl. 435-289.000.
Guinon, Walter J.: *See*—
Van Broekhoven, Paul; and Guinon, Walter J., 4,890,055, Cl. 324-77.00B.
Gundersen, Martin A. Optically triggered back-lighted thyratron network. 4,890,040, Cl. 315-155.000.
Guomundsson, Edgar; and Asmundsson, Oli J. Structural panel. 4,888,933, Cl. 52-779.000.
Gurak, Nur R.; Thompson, Ronald J.; Russell, James P.; and Yarkovsky, Joseph M., to BASF Aktiengesellschaft. Process for manufacturing green and ceramic foam. 4,889,670, Cl. 264-50.000.
Gurley, John A.: *See*—
Elings, Virgil B.; and Gurley, John A., 4,889,988, Cl. 250-306.000.
Gurnari, Lawrence: *See*—
Soriente, Alfonse J.; and Gurnari, Lawrence, 4,889,624, Cl. 210-232.000.
Gustafsson, Jan-Erik V.: *See*—
Andersson, Birgitta S.; Zethraeus, Malin C.; Herngren, Torbjorn; and Gustafsson, Jan-Erik V., 4,889,592, Cl. 162-29.000.
Gutek, Beth I.; and Wright, Antony P., to Dow Corning Corporation. Process for synthesis of acylamino organosilicon compounds. 4,889,942, Cl. 556-419.000.
Guth, Josef: *See*—
Bott, Kaspar; Hartmann, Horst; and Guth, Josef, 4,889,950, Cl. 560-205.000.
Gutkowicz-Krusin, Dina: *See*—
Elbaum, Marek; Gutkowicz-Krusin, Dina; and Nowakowski, Jerzy, 4,889,398, Cl. 350-3.670.
Gyger, Roger F.: *See*—
Tyree, Lewis, Jr.; Gyger, Roger F.; and Rhoades, George D., 4,888,955, Cl. 62-47.100.
Gynex, Inc.: *See*—
El-Rashidy, Ragab, 4,889,634, Cl. 210-646.000.
H. Niemeyer Sohne GmbH & Co. KG: *See*—
Barlage, Bruno; and Robert, Franz-Josef, 4,889,190, Cl. 172-49.500.
Haas, Roland: *See*—
Brandenstein, Manfred; Herrmann, Gerhard; and Haas, Roland, 4,889,520, Cl. 474-135.000.
Hadeler, Dieter; and Appeldorn, Alfred, to Licentia Patent-Verwaltungs-GmbH. Electric motor having a protector switch. 4,890,025, Cl. 310-68.00C.
Haemonetics Corporation: *See*—
Fell, Claude; Pages, Etienne; and Uhlmann, Dominique, 4,889,524, Cl. 494-12.000.
Hagarty, John D., to S. C. Johnson & Son, Inc. Aerosol foam bait insecticide. 4,889,710, Cl. 424-45.000.
Hagarty, Jon R., to J. I. Case Company. Composite engine enclosure. 4,889,203, Cl. 180-69.240.
Hageag Holding Inc.: *See*—
Eickelmann, Lothar, 4,890,001, Cl. 307-38.000.
Hageman, David C., to Premier Industrial Corporation. Load indicator. 4,889,457, Cl. 411-10.000.
Hagner, George R., to Northern Telecom Limited. Circuit board with coaxial circuit and method therefor. 4,889,962, Cl. 174-68.500.
Haindl, Hans, to B. Braun Melsungen AG. Needle. 4,889,529, Cl. 604-274.000.
Hakala, Timo; and Lehtonen, Reijo, to Euromaski OY. Full view welding shield. 4,888,825, Cl. 2-8.000.
Haken, Roger A.: *See*—
Tang, Thomas E.; Wei, Che-Chia; Haken, Roger A.; and Chapman, Richard A., 4,890,141, Cl. 357-23.300.
Teng, Clarence W.; and Haken, Roger A., 4,890,147, Cl. 357-23.110.
Hako Minuteman, Inc.: *See*—
Smith, Ronald J.; Lerch, Thomas J.; and McLeod, Rick, 4,888,843, Cl. 15-98.000.
Hale, David E.: *See*—
Knight, Harold W.; and Hale, David E., 4,888,903, Cl. 43-1.000.
Hall, Stanley D.: *See*—
Rice, Donald D.; Hawkins, James C.; and Hall, Stanley D., 4,889,158, Cl. 137-484.400.
Halliburton Company: *See*—
Lee, Lindsey D., 4,889,449, Cl. 405-154.000.
Halliburton Services: *See*—
Sommers, Kenneth C.; Wesson, David S.; and George, Kevin R., 4,889,183, Cl. 166-55.000.
Halliden, Paul W.: *See*—
Beker, Henry J.; Halliden, Paul W.; and Friend, John M. K., 4,890,323, Cl. 380-25.000.
Hama, Yoshihiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Manual control apparatus of zoom lens barrel for an auto focus camera. 4,890,132, Cl. 354-400.000.
Hamada, Kazuichi: *See*—
Fujiwara, Tadayoshi; Yamaoka, Yukio; Hamada, Kazuichi; Yamada, Yoshiro; Kawaguchi, Yasunobu; Oki, Yasuhiro; Taniguchi, Takashi; and Takahashi, Hiroyuki, 4,889,567, Cl. 148-12.00B.
Hamada, Tetsuro; Shimada, Kazuhiko; Masuda, Katsuhiko; and Shibuya, Kazunori, to Honda Giken Kogyo K.K. Direction-dependent power transmission system. 4,889,353, Cl. 180-233.000.
Hamada, Toru: *See*—
Nakaniwa, Shinpei; Otani, Seiichi; Hamada, Toru; Osaki, Masanobu; Hoshino, Yukio; and Tomisawa, Naoki, 4,889,100, Cl. 123-492.000.
Hamaguchi, Yuichi: *See*—
Naitoh, Kazumi; Arakawa, Yoshiaki; Ikezaki, Takashi; Yabe, Shoji; Yokoyama, Yutaka; Hamaguchi, Yuichi; Roppongi, Yasunobu; and Hamaguchi, Yuichi, 4,889,536, Cl. 29-570.100.
Naitoh, Kazumi; Arakawa, Yoshiaki; Ikezaki, Takashi; Yabe, Shoji; Yokoyama, Yutaka; Hamaguchi, Yuichi; Roppongi, Yasunobu; and Hamaguchi, Yuichi, 4,889,536, Cl. 29-570.100.
Hamaker, Jon B.: *See*—
Amundson, Donald E.; Hamaker, Jon B.; Pecht, Glenn G.; and Sedy, Josef, 4,889,348, Cl. 277-1.000.
Hamamoto, Kouji: *See*—
Kawai, Naoki; Hamamoto, Kouji; and Hosokawa, Tomiaki, 4,889,969, Cl. 219-130.510.
Hamamoto, Tadanao: *See*—
Izawa, Minoru; Hamamoto, Tadanao; Ishikawa, Masaru; Dohke, Harumi; and Nakano, Tasuku, 4,890,037, Cl. 315-77.000.
Hanagata, Haruo: *See*—
Oshima, Katsuhide; Murai, Toshiaki; Sakurai, Hitoshi; Igarashi, Shuji; Hanagata, Haruo; and Igarashi, Hidesato, 4,889,602, Cl. 204-38.100.
Handwerk, Volker: *See*—
Oldendorf, Christian; Maaz, Gunther; Nottbohm, Klaus; and Handwerk, Volker, 4,889,201, Cl. 177-25.140.
Hansen, James R.; Nicholson, Myron D.; and Sherry, Jeffrey B., to Viskase Corporation. Liquid smoke impregnated peelable fibrous food casing article. 4,889,751, Cl. 428-34.800.

Hansen, Kent G., to Magna International (Canada) Inc. Method of optimizing armature balance through lamination orientation. 4,888,866, Cl. 29-598.000.

Hanson, Merle E.; and Thorson, Lewis D., to Comdisco Resources, Inc. Overlapping horizontal fracture formation and flooding process. 4,889,186, Cl. 166-252.000.

Hanssen, Carl-Otto, to Molnlycke AB. Surgical drape and a method for its manufacture. 4,889,136, Cl. 128-855.000.

Hantz, Dominique; Antoine, Dominique; and Jackowski, Bruno, to SEB S.A. Electric household appliance combining a toaster and an oven. 4,889,042, Cl. 99-340.000.

Hara, Jun, to Morinaga & Co., Ltd. Aerochocolates and process for preparing the same. 4,889,738, Cl. 426-572.000.

Hara, Kazuya; and Rikuna, Kenji, to Casio Computer Co., Ltd. Electronic memory card and method of manufacturing same. 4,889,980, Cl. 235-488.000.

Harada Kogyo Kabushiki Kaisha: *See*—
Egashira, Yoshimi, 4,890,114, Cl. 343-702.000.

Haragashira, Motoji, to Kabushiki Kaisha Toshiba. Automatic impedance adjuster for MRI system. 4,890,062, Cl. 324-322.000.

Haragashira, Motoji, to Kabushiki Kaisha Toshiba. Probe coil system for magnetic resonance apparatus. 4,890,063, Cl. 324-322.000.

Haraguchi, Noriyasu: *See*—
Seki, Yukuharu; and Haraguchi, Noriyasu, 4,889,580, Cl. 156-382.000.

Harame, David L.: *See*—
Davari, Bijan; Ganin, Eti; Harame, David L.; and Sai-Halasz, George A., 4,889,819, Cl. 437-27.000.

Harbeke, Gerold J. Fire-retardant fluid coupling assembly and method. 4,888,925, Cl. 52-232.000.

Harbers, H. C., Jr., to Escorp, Inc. Manually actuable, machine readable menu card with rib controlled bubbles. 4,889,981, Cl. 235-490.000.

Haring, Petrus: *See*—
Doornbos, Tamme S. M.; Haring, Petrus; and Van Der Heijden, Arnoldus, 4,889,736, Cl. 426-536.000.

Harper, Harold M.; and Holtman, Mark C., to Tecumseh Products Company. Suction accumulator strap. 4,888,962, Cl. 62-503.000.

Harris Corporation: *See*—
Heckaman, Douglas E.; Perkins, Gilbert R.; and Higman, Roger H., 4,890,195, Cl. 361-386.000.
Maney, John J., 4,890,047, Cl. 318-661.000.

Hartings, Michael F., to Monarch Marking Systems, Inc. Magnetic antenna. 4,890,115, Cl. 343-742.000.

Hartmann, Horst: *See*—
Bott, Kaspar; Hartmann, Horst; and Guth, Josef, 4,889,950, Cl. 560-205.000.

Hartog, Jan; and Mos, Johannes, to Duphar International Research B.V. Anxiolytically active piperazine derivatives. 4,889,852, Cl. 514-230.500.

Hartwell, James A.: *See*—
Willer, Rodney L.; Hartwell, James A.; and Gleeson, Robert G., 4,889,571, Cl. 149-19.900.

Haruna, Koichi: *See*—
Watanabe, Toshinori; Haruna, Koichi; Motoyama, Hiroshi; Nishigaki, Toru; Sasaki, Koji; Yakata, Teruo; and Watanabe, Yoshitaka, 4,890,227, Cl. 364-300.000.

Hasegawa, Masahide, to Canon Kabushiki Kaisha. Image pick-up apparatus for producing video signals of high information density in time base direction. 4,890,165, Cl. 358-213.260.

Hasegawa, Shusaku: *See*—
Sasamoto, Yasuhiko; Hasegawa, Shusaku; and Okazaki, Atsushi, 4,889,742, Cl. 426-643.000.

Hasegawa, Tsutomu: *See*—
Inuzuka, Toshio; Hasegawa, Tsutomu; Tomikawa, Minato; and Aoki, Shigeru, 4,889,766, Cl. 428-324.000.

Hashimoto, Hiroshi, to Omron Tateisi Electronics Company. Electromagnetic relay with an operation indicating member. 4,890,080, Cl. 335-17.000.

Hashimoto, Ichiro; Ishizaki, Kosho; Hayashida, Hiroshi; and Miyashita, Kunio, to Hitachi, Ltd. Low-speed high-torque motor. 4,890,024, Cl. 310-49.00R.

Hashimoto, Masashi; and Tachibana, Tadashi, to Texas Instruments Incorporated. Semiconductor memory with built-in defective bit relief circuit. 4,890,262, Cl. 365-200.000.

Hashimoto, Takatsugu; and Tomiya, Seisuke, to Bridgestone Corporation. Process for curing tire employing a bladder lubricant. 4,889,677, Cl. 264-297.500.

Hashizume, Yoshikazu; and Kamiya, Haruo, to Atsugi Motor Parts Company, Limited. Electromagnetic flow control valve for pressure control of the like. 4,889,314, Cl. 251-129.020.

Haslanger, Martin F.; and Gordon, Eric M., to E. R. Squibb & Sons, Inc. Hydroxamic acid derivatives and method of using same. 4,889,874, Cl. 514-575.000.

Hata, Toshinobu: *See*—
Fukizawa, Kazunori; Ohshima, Toyoko; and Hata, Toshinobu, 4,889,774, Cl. 428-614.000.

Hatachi, Ltd.: *See*—
Izunaga, Yasushi; Kuno, Hiroaki; and Sado, Shintaro, 4,889,471, Cl. 417-32.000.

Hattori, Toshihiko: *See*—
Hitomi, Mitsuo; Yuzuriha, Yasuhiro; Hattori, Toshihiko; and Yamashita, Akinori, 4,889,082, Cl. 123-52.00M.

Hauff, Werner, to Plastoform GmbH & Co. KG. Wall feedthrough fitting. 4,889,298, Cl. 248-56.000.

Haug, Walter, to Kassbohrer of North America, Inc. Levelling attachment. 4,888,891, Cl. 37-222.000.

Haumann, Klaus; and Kildegaard, Ejvind, to Butina I/S. Gondola for the transport of animals to be slaughtered, preferably hogs, in an anaesthesia system. 4,888,855, Cl. 17-1.00A.

Hauser, Henry A.: *See*—
Pryor, James W.; Raker, Mark L.; Sensabaugh, Andrew J., Jr.; and Hauser, Henry A., 4,889,143, Cl. 131-331.000.

Hauslaib, Wolfgang: *See*—
Gomoll, Gunter; and Hauslaib, Wolfgang, 4,889,270, Cl. 226-181.000.

Havens, Stephen J.: *See*—
Hergenrother, Paul M.; Connell, John W.; and Havens, Stephen J., 4,889,912, Cl. 528-125.000.

Havlovitz, Paul M., to Republic Tool & Manufacturing Corp. Utility card with foldable handle. 4,889,360, Cl. 280-655.100.

Hawe-Neos Dental Dr. H.v. Weissenfluh AG: *See*—
Von Weissenfluh, Beat, 4,889,489, Cl. 433-134.000.

HAWERA Probst GmbH+Co.: *See*—
Moser, Bernhard, 4,889,200, Cl. 175-394.000.

Hawkins, James C.: *See*—
Rice, Donald D.; Hawkins, James C.; and Hall, Stanley D., 4,889,158, Cl. 137-484.400.

Hawkins, Ralph T., II. Laser light source with reduced sensitivity to optical feedback effects. 4,890,290, Cl. 372-33.000.

Hawkins, Steven E.: *See*—
Hudgins, Roger L.; and Hawkins, Steven E., 4,889,639, Cl. 210-739.000.

Hayakawa, Masaharu: *See*—
Kobayashi, Tetsuo; and Hayakawa, Masaharu, 4,890,169, Cl. 360-10.300.

Hayakawa, Toshiro: *See*—
Taneya, Mototaka; Takahashi, Kosei; Hayakawa, Toshiro; Matsui, Sadayoshi; Matsumoto, Mitsuhiro; and Hosoba, Hiroyuki, 4,890,293, Cl. 372-46.000.

Hayakawa, Youichi: *See*—
Yamada, Yoshihiro; Shirai, Ryoichi; and Hayakawa, Youichi, 4,889,621, Cl. 210-168.000.

Hayama, Masahiro: *See*—
Numano, Yoshinori; and Hayama, Masahiro, 4,889,983, Cl. 250-211.00J.

Hayano, Fuminori; Imamura, Kazunori; Murata, Sunao; and Kato, Kinya, to Nikon Corporation. Apparatus with four light detectors for checking surface of mask with pellicle. 4,889,998, Cl. 250-563.000.

Hayashida, Hiroshi: *See*—
Hashimoto, Ichiro; Ishizaki, Kosho; Hayashida, Hiroshi; and Miyashita, Kunio, 4,890,024, Cl. 310-49.00R.

Hayashida, Yasumasa: *See*—
Ogou, Sunoo; Ishii, Shigemichi; Tagomori, Sadaaki; Fukushima, Takuo; and Hayashida, Yasunasa, 4,889,312, Cl. 249-216.000.

Haydon, Robert, to Southwestern Bell Telephone Company. Method of identifying the disposition of plug-in units at a warehouse. 4,889,977, Cl. 235-375.000.

Hayes, William J. Computer air filter device and method. 4,889,542, Cl. 55-97.000.

Haynes International, Inc.: *See*—
Klarstrom, Dwaine L., 4,889,696, Cl. 422-211.000.

Head, John C.: *See*—
Rowson, Graham P.; Head, John C.; Westermann, Jurgen; Kruger, Martin; Arndt, Friedrich; and Rees, Richard, 4,889,553, Cl. 71-92.000.

Health Research, Inc.: *See*—
Dougherty, Thomas J.; Potter, William R.; and Weishaupt, Kenneth R., 4,889,129, Cl. 128-664.000.

Heath, Chester A.; Jackson, Kevin M.; Judice, Darryl E.; and Pestonji, Hoshang R., to International Business Machines Corporation. Mode conversion of computer commands. 4,890,219, Cl. 364-200.000.

Heaton, John C.: *See*—
Kindt-Larsen, Ture; Heaton, John C.; and Rastrelli, Edmund C., 4,889,664, Cl. 264-2.600.

Heckaman, Douglas E.; Perkins, Gilbert R.; and Higman, Roger H., to Harris Corporation. Replaceable MMIC chip carrier captured by differential thermal expansion between carrier and support housing. 4,890,195, Cl. 361-386.000.

Hedberg, Bo G., to Telefonaktiebolaget L M Ericsson. Arrangement for compensating errors in a quadrature modulator. 4,890,301, Cl. 375-60.000.

Hefti, Heinz; Artz, Klaus; Weber, Kurt; Burdeska, Kurt; and Reinehr, Dieter, to Ciba-Geigy Corporation. Mixtures of fluorescent whitening agents. 4,889,655, Cl. 252-301.220.

Hehl, Karl. Changing device for changing the plastic material to be supplied to a horizontal injecting unit of an injection molding machine. 4,889,479, Cl. 425-185.000.

Hehn, Bruce A.; and Sankey, James K., to Alpha Enterprises, Inc. Storage container for audio cassette tape boxes and digital audio compact disc boxes. 4,889,244, Cl. 211-41.000.

Heinrich, Rolf: *See*—
Werner, Johannes; Kerschbaum, Walter; and Heinrich, Rolf, 4,889,090, Cl. 123-197.0AC.

Heinz RUHL: *See*—
Zahlaus, Helmut, 4,889,467, Cl. 414-746.200.

Heinzmann, Albert; and Rottweiller, Gerhard. Method and apparatus for continuous production of impregnated compound. 4,889,429, Cl. 366-71.000.

Heitmann, Uwe; and Brand, Peter, to Korber AG. Method of and apparatus for simultaneously making plural tobacco streams. 4,889,138, Cl. 131-84.100.

Heitmann, Uwe, to Korber AG. Method of and machine for making a rod-like filler of fibrous material. 4,889,139, Cl. 131-84.300.

Helena Laboratories Corporation: *See—*
Sarrine, Robert J.; Garsee, Henry A.; Kelley, Charles D.; and Guadagno, Philip A., 4,890,247, Cl. 364-571.040.

Hellums, James R., to Texas Instruments Incorporated. Temperature constant current reference. 4,890,052, Cl. 323-315.000.

Hellwig, Karl-Ruediger: *See—*
Barzynski, Helmut; Benthack-Thomas, Heidi; Hellwig, Karl-Ruediger; and Taubitz, Christof, 4,889,756, Cl. 428-64.000.

Helmes, Ludger; and Lienenluke, Paul, to Vorwerk & Co. Interholding GmbH. Vacuum cleaner nozzle arrangement. 4,888,850, Cl. 15-359.000.

Hemming, Dale R., to Graco Inc. Method of selecting optimum series limiting resistance for high voltage control circuit. 4,890,190, Cl. 361-235.000.

Hemsley, Stephen T.; and Roszowski, Bogdan, to James Hardie Building Products Pty. Limited. Jet spray sprinkler. 4,889,287, Cl. 239-498.000.

Hendixen, Arne B.; Bowen, William A.; Evans, Michael W.; Hurley, John J.; and Leslie, Samuel A., to Orion Industries, Inc. Cellular remote station with multiple coupled units. 4,890,315, Cl. 379-59.000.

Hendricks, Douglas W.: *See—*
Mullen, William B., III; and Hendricks, Douglas W., 4,889,275, Cl. 228-180.200.

Hendrikx, Dale E.: *See—*
McCallum, Robert S.; and Hendrikx, Dale E., 4,890,123, Cl. 346-159.000.

Henikoff, Steven; and Gelinas, Richard E., to Fred Hutchinson Cancer Research Center. Reagent kit producing shortened target DNA segments usable in sequencing large DNA segments. 4,889,799, Cl. 435-6.000.

Henkel Kommanditgesellschaft auf Aktien: *See—*
Amberg, Guenther; Bechstedt, Wolfgang; Schulz, Paul; and Trabitzsch, Uwe, 4,889,644, Cl. 252-8.900.
Schmid, Karl H.; and Biermann, Manfred, 4,889,925, Cl. 536-18.600.

Hensby, Christopher: *See—*
Shroot, Braham; Lang, Gerard; Maignan, Jean; Restle , Serge; Hensby, Christopher; and Colin, Michel, 4,889,865, Cl. 514-332.000.

Henson, Stephen R.: *See—*
Dawes, Antony J. O.; and Henson, Stephen R., 4,890,098, Cl. 340-721.000.

Henzi, Beat, to Sandoz Ltd. 4-Substituted benzothiazol-2-ylazo-N-c8-14-alkykl-N-(2'-cyanoethyl)anilines optionally having a 3-C1-4-alkyl group. 4,889,535, Cl. 8-639.000.

Hergenrother, Paul M.; Connell, John W.; and Havens, Stephen J., to United States of America, National Aeronautics and Space Administration. Acetylene terminated aspartimides and resins therefrom. 4,889,912, Cl. 528-125.000.

Hergeth Hollingsworth GmbH: *See—*
Pinto, Akiva; Lucassen, Guenter; and Schmidt, Reinhard, 4,888,857, Cl. 19-80.00R.

Herman, Martin A. Flotation assembly. 4,889,511, Cl. 441-88.000.

Hermann Berstorff Maschinenbau GmbH: *See—*
Mueller, Werner, 4,889,430, Cl. 366-85.000.

Herngren, Torbjorn: *See—*
Andersson, Birgitta S.; Zethraeus, Malin C.; Herngren, Torbjorn; and Gustafsson, Jan-Erik V., 4,889,592, Cl. 162-29.000.

Herrli, Peter, to Contempo Products, P. Herrli. Two-piece coupling device for fluid exchange. 4,889,527, Cl. 604-29.000.

Herrmann, Gerhard: *See—*
Brandenstein, Manfred; Herrmann, Gerhard; and Haas, Roland, 4,889,520, Cl. 474-135.000.

Herrod, John A.: *See—*
Anthias, Tefcros, Herrod, John A.; and Trees, George M., 4,890,257, Cl. 364-900.000.

Herron, Carlisle M.; Dean, Walter L.; Moore, Danny R.; Owens, James W.; and Schoggen, Howard L., to Procter & Gamble Cellulose Company, The. Process for making individualized, crosslinked fibers having reduced residuals and fibers thereof. 4,889,595, Cl. 162-157.600.

Hesketh, Gary W.: *See—*
Neil, Alan; Hesketh, Gary W.; and Bojeck, Gary, 4,889,066, Cl. 114-334.000.

Hess, Hans-Peter; and Hlousek, Peter, to Brose Fahzeugteile GmbH & Co. Kommanditgesellschaft. Drive arrangement for a window lifting mechanism. 4,888,916, Cl. 49-352.000.

Hess, Joachim. Stacking and surface protection device on a protective housing made of a synthetic material. 4,889,235, Cl. 206-511.000.

Hettche, Albert: *See—*
Schuster, Ludwig; Hettche, Albert; Liedy, Werner; Weiss, Stefan; and Ehemann, Leo, 4,889,897, Cl. 525-388.000.

Hetterich, Herrmann: *See—*
Brandenstein, Manfred; and Hetterich, Herrmann, 4,888,862, Cl. 29-148.40A.

Hewlett-Packard Company: *See—*
Curtis, George S., 4,890,071, Cl. 331-11.000.
Fremont, Michael J., 4,890,224, Cl. 364-200.000.
Kilk, Erik; Smith, David A.; and Schmidt, Alan W., 4,890,236, Cl. 364-485.000.
Rudolph, Arno, 4,890,267, Cl. 367-103.000.
Taylor, David B.; and Zemke, Steven C., 4,889,959, Cl. 174-35.0GC.

Heyl, Robert D., to Young Industries, Inc., The. Vented product pump and air filter arrangement. 4,889,452, Cl. 406-85.000.

Hi-Tech Ceramics, Inc.: *See—*
Morris, Jeffrey R.; and Burlingame, Nicholas H., 4,889,481, Cl. 431-328.000.

Hicks, Bruce W.: *See—*
Mason, John Y.; Hicks, Bruce W.; and English, Donald C., 4,889,654, Cl. 252-100.000.

Hidaka, Hideto; Fujishima, Kazuyasu; and Matsuda, Yoshio, to Mitsubishi Denki Kabushiki Kaisha. Variable word length circuit of semiconductor memory. 4,890,261, Cl. 365-73.000.

Higaki, Yuzo; Goto, Hiroyuki; and Tanikawa, Keiichi, to Nisshin Oil Mills, Ltd., The; and Nippon Steel Corporation. Cold-rolling oils for steel plates. 4,889,648, Cl. 252-49.500.

Higashi, Kazutada; Tokuda, Masamori; Nakano, Hiroshi; and Ohta, Tomozo, to Sharp Kabushiki Kaisha. Reflection type SSB modulator. 4,890,076, Cl. 332-170.000.

Higashi, Shigeyasu: *See—*
Maeno, Yorihiko; and Higashi, Shigeyasu, 4,890,054, Cl. 324-58.50A.

Higman, Roger H.: *See—*
Heckaman, Douglas E.; Perkins, Gilbert R.; and Higman, Roger H., 4,890,195, Cl. 361-386.000.

Higuchi, Kazuhiko: *See—*
Hirahara, Shuzo; Nagato, Hitoshi; Higuchi, Kazuhiko; Yamada, Kiyoshi; Ohno, Tadayoshi; and Kanai, Tsutomu, 4,890,121, Cl. 346-76.0PH.

Higuchi, Masahiro: *See—*
Kosaka, Takao; Miyauchi, Masahiro; Koike, Naomasa; and Higuchi, Masahiro, 4,889,841, Cl. 503-209.000.

Hijikigawa, Masaya: *See—*
Sugihara, Takashi; and Hijikigawa, Masaya, 4,889,561, Cl. 106-196.000.

Hiki, Toshio: *See—*
Matsumoto, Yoshikane; Hiki, Toshio; and Kurosawa. Makoto, 4,889,052, Cl. 101-93.040.

Hill, Norris L., to Westinghouse Electric Corp. Transformer assembly. 4,890,086, Cl. 336-210.000.

Hillestad, Mark W.: *See—*
Hillestad, Tollief O.; and Hillestad, Mark W., 4,889,454, Cl. 408-124.000.

Hillestad, Tollief O.; and Hillestad, Mark W. Portable power tool for milling tube ends. 4,889,454, Cl. 408-124.000.

Hime, Sherry R. Transportable seat insert especially adapted for infants. 4,889,388, Cl. 297-464.000.

Himont Incorporated: *See—*
Bassi, Mauro; Garagnani, Enea; and Gorini, Giuseppe, 4,889,888, Cl. 525-75.000.

Hinds, Walter E.; and Lewis, Martyn A. Linear induction motor systems. 4,890,023, Cl. 310-12.000.

Hinshaw, Howard G., to Thermalloy Incorporated. Solderable heat sink fastener. 4,890,196, Cl. 361-388.000.

Hirahara, Shuzo; Nagato, Hitoshi; Higuchi, Kazuhiko; Yamada, Kiyoshi; Ohno, Tadayoshi; and Kanai, Tsutomu, to Kabushiki Kaisha Toshiba. Halftone image printing device. 4,890,12:, Cl. 346-76.0PH.

Hirano, Atsushi: *See—*
Mae, Yoshiharu; Oka, Tsutomu; and Hirano, Atsushi, 4,889,170, Cl. 148-407.000.

Hirata, Atsuomi; and Mamiya, Hirokuni, to Matsushita Electric Works, Ltd. Plastic molded chip carrier package and method of fabricating the same. 4,890,152, Cl. 357-72.000.

Hirata, Hideyuki, to NEC Corporation. Frame relay type data switching apparatus. 4,890,280, Cl. 370-60.000.

Hirata, Makizo: *See—*
Fujikawa, Tetsuzo; Hirata, Makizo; and Tamba, Shinichi, 4,889,089, Cl. 123-195.0HC.

Hird, John: *See—*
Newcombe, Haydn J.; and Hird, John, 4,889,162, Cl. 137-606.000.
Newcombe, Haydn J.; and Hird, John, 4,889,165, Cl. 137-801.000.

Hird, John A.; Owen, Lindsey D.; and Rice, Michael R., to Intellicall, Inc. Automatic validation of telephone account numbers. 4,890,317, Cl. 379-132.000.

Hirose Electric Co., Ltd.: *See—*
Masaki, Takashi, 4,888,864, Cl. 29-753.000.
Sato, Kensaku, 4,889,501, Cl. 439-595.000.

Hirose, Shintaro, to Sanyo Electric Co., Ltd. Method and apparatus for decoding error correcting code. 4,890,286, Cl. 371-37.100.

Hitachi Construction Machinery Co., Ltd.: *See—*
Nagasawa, Kiyoshi; Ono, Kozo; Ogata, Kojiro; Murayama, Ken; and Hoshino, Yoshihiro, 4,888,878, Cl. 33-573.000.

Hitachi Koki Company, Limited: *See—*
Matsumoto, Yoshikane; Hiki, Toshio; and Kurosawa, Makoto, 4,889,052, Cl. 101-93.040.

Hitachi, Ltd.: *See—*
Hashimoto, Ichiro; Ishizaki, Kosho; Hayashida, Hiroshi; and Miyashita, Kunio, 4,890,024, Cl. 310-49.00R.
Horigome, Shinkichi; Niihara, Toshio; Ohta, Norio; Sugita, Yutaka; Miyamura, Yoshinori; Sudo, Ryoichi; Miwa, Hiroaki; and Tajima, Tetsuo, 4,889,757, Cl. 428-64.000.
Ikeda, Shuji; Nagasawa, Kouichi; Meguro, Satoshi; and Yamamoto, Sho, 4,890,148, Cl. 357-45.000.
Inohana, Haruyuki; Takaoka, Saburo; and Takada, Hideaki, 4,890,170, Cl. 360-65.000.

Masuda, Ikuro; Kato, Kazuo; Sasayama, Takao; Nishio, Yoji; Kuboki, Shigeo; and Iwamura, Masahiro, 4,890,017, Cl. 307-446.000.
Miyazaki, Hideki; Onda, Kenichi; and Matsuda, Yasuo, 4,890,009, Cl. 307-270.000.
Nakagawa, Yaoko; and Ishii, Koichi, 4,890,220, Cl. 364-200.000.
Sasaki, Hideki; Matsuoka, Shigeru; Matsuda, Eiji; Yonenaga, Hitoshi; and Fukushima, Masahito, 4,890,256, Cl. 364-900.000.
Takeda, Ryuzaburo; Koizumi, Hideaki; and Miyamoto, Yoshiyuki, 4,889,127, Cl. 128-653.000.
Tsubaki, Tohru, 4,890,193, Cl. 361-341.000.
Tsutsumi, Yoshitsugu; Ueda, Shinjiro; and Otaka, Tadashi, 4,889,995, Cl. 250-441.100.
Umetani, Keiji; Ueda, Ken; Suzuki, Ryuichi; and Yokouchi, Hisatake, 4,890,310, Cl. 378-82.000.
Watanabe, Toshinori; Haruna, Koichi; Motoyama, Hiroshi; Nishigaki, Toru; Sasaki, Koji; Yakata, Teruo; and Watanabe, Yoshitaka, 4,890,227, Cl. 364-300.000.

Hitachi Metals, Ltd.: *See—*
Ishihara, Yasuoki; Obato, Fumio; Sakai, Jun; and Natsume, Takeshi, 4,889,687, Cl. 420-13.000.
Suenaga, Makoto; Obata, Fumio; Sakai, Jun; and Natsume, Takeshi, 4,889,688, Cl. 420-22.000.

Hitomi, Mitsuo; Yuzuriha, Yasuhiro; Hattori, Toshihiko; and Yamashita, Akinori, to Mazda Motor Corporation. Intake system for multiple-cylinder engine. 4,889,082, Cl. 123-52.00M.

Hix, Veldon M.: *See—*
Willard, Miles J.; Dayley, Kyle E.; Hix, Veldon M.; and Holm, David A., 4,889,733, Cl. 426-438.000.
Willard, Miles J.; Dayley, Kyle E.; Hix, Veldon M.; and Holm, David A., 4,889,737, Cl. 426-550.000.

Hlousek, Peter: *See—*
Hess, Hans-Peter; and Hlousek, Peter, 4,888,916, Cl. 49-352.000.

Hoberman, Max. Automatic infrared microorganism detection instrument. 4,889,992, Cl. 250-343.000.

Hodson, Harry, to Concrete Technology Corporation. Rotary mill. 4,889,428, Cl. 366-1.000.

Hoechst Aktiengesellschaft: *See—*
Ehrhardt, Heinz; Mildenberger, Hilmar; Maier, Thomas; Schaller, Rainer; Sachse, Burkhard; and Braun, Peter, 4,889,864, Cl. 514-326.000.
Kleiner, Hans-Jerg, 4,889,661, Cl. 562-815.000.
Kolkmann, Friedrich; and Jodden, Klaus, 4,889,702, Cl. 423-323.000.
Mischke, Peter; and Schladetsch, Hans J., 4,889,923, Cl. 534-597.000.
Stahlhofen, Paul; and Frass, Hans W., 4,889,788, Cl. 430-191.000.

Hoechst Aktiengsellschaft: *See—*
Stahlhofen, Paul, 4,889,789, Cl. 430-191.000.

Hoeft, Benoit, to Kaysersberg S.A. Plastic film feeding machine, as used in agriculture. 4,888,913, Cl. 47-9.000.

Hoffman, Brian D.; and Pollack, Steven H., to Megamation Incorporated. Robotic system. 4,890,241, Cl. 364-513.000.

Hoffman, Henry E.: *See—*
Reilly, Kenneth T.; Douglas, Alan D.; and Hoffman, Henry E., 4,889,703, Cl. 423-326.000.

Hoffman-La Roche Inc.: *See—*
Widmer, Ulrich, 4,889,854, Cl. 514-228.200.

Hoffmann, Elmer L., to Schwalm Electronics Inc. Facial sauna. 4,889,970, Cl. 219-271.000.

Hoffmann-La Roche Inc.: *See—*
Fischer, Ulf; Schneider, Fernand; and Widmer, Ulrich, 4,889,848, Cl. 514-212.000.

Hohe KG: *See—*
Gillet, Jean-Luc, 4,889,308, Cl. 248-485.000.

Hojnoski, David E. Cork stopper for bottles of wine. 4,889,251, Cl. 215-296.000.

Hojo, Yoshikata: *See—*
Oda, Kengo; Ishii, Tsutomu; Fukushi, Yukiharu; Enomoto, Yuji; Nishida, Makoto; and Hojo, Yoshikata, 4,889,551, Cl. 71-88.000.

Holley, George H.: *See—*
Salem, Robert J.; and Holley, George H., 4,889,131, Cl. 128-671.000.

Hollister Incorporated: *See—*
Metz, Michael; Tokarz, Joseph S.; and Jensen, Marvin E., 4,889,532, Cl. 604-330.000.
Mohiuddin, Mahmood; Schneider, Barry L.; and Kay, Paul O., 4,889,534, Cl. 604-339.000.

Holm, David A.: *See—*
Willard, Miles J.; Dayley, Kyle E.; Hix, Veldon M.; and Holm, David A., 4,889,733, Cl. 426-438.000.
Willard, Miles J.; Dayley, Kyle E.; Hix, Veldon M.; and Holm, David A., 4,889,737, Cl. 426-550.000.

Holmberg, Dick L. Erosion control foundation mat and method. 4,889,446, Cl. 405-19.000.

Holt, Neil L.: *See—*
Connolly, Joseph; Holt, Neil L.; Richardson, Anthony R. W.; and Siedenburg, Jay, 4,889,506, Cl. 439-874.000.

Holtman, Mark C.: *See—*
Harper, Harold M.; and Holtman, Mark C., 4,888,962, Cl. 62-503.000.

Holtzman, Marc E. Disposable sample preparation container. 4,889,692, Cl. 422-102.000.

Holz, Walter: *See—*
Lohnherr, Ludger; and Holz, Walter, 4,889,289, Cl. 241-18.000.

Homer, John C., to General Signal Corporation. Level sensor system. 4,888,989, Cl. 73-304.00C.

Honda Giken Kogyo K.K.: *See—*
Hamada, Tetsuro; Shimada, Kazuhiko; Masuda, Katsuhiko; and Shibuya, Kazunori, 4,889,353, Cl. 180-233.000.
Ishihara, Yasuoki; Obato, Fumio; Sakai, Jun; and Natsume, Takeshi, 4,889,687, Cl. 420-13.000.
Suenaga, Makoto; Obata, Fumio; Sakai, Jun; and Natsume, Takeshi, 4,889,688, Cl. 420-22.000.

Honda Giken Kogyo Kabushiki Kaisha: *See—*
Fukizawa, Kazunori; Ohshima, Toyoko; and Hata, Toshinobu, 4,889,774, Cl. 428-614.000.
Furuya, Kunitaka; and Shibahata, Yasuji, 4,889,204, Cl. 180-197.000.
Iwata, Takahiro, 4,889,014, Cl. 74-858.000.
Obata, Keiichi; Yoshida, Suguru; Saitoh, Masahiro; and Ono, Yoshinobu, 4,889,678, Cl. 264-313.000.
Okada, Eiichi; Ozawa, Akira; Kousaka, Tomomi; and Ohba, Hirokazu, 4,888,865, Cl. 29-568.000.
Tabata, Hiroshi; and Akiyama, Akihiko, 4,889,068, Cl. 116-203.000.
Takeda, Akihiko; Kaneda, Hiroyuki; and Suzuki, Shigeru, 4,889,079, Cl. 123-41.82R.
Yagi, Toru; Fujiyoshi, Yoshihiro; Aoki, Takatoshi; and Urata, Yasuhiro, 4,889,085, Cl. 123-90.120.
Yoshimi, Ishikawa, 4,889,205, Cl. 180-227.000.

Honda, Koichi: *See—*
Nagawa, Yoshinobu; Honda, Koichi; and Nakanishi, Hiroshi, 4,889,937, Cl. 548-420.000.

Honey, Richard C.: *See—*
Pohlmann, Juergen L. W.; Honey, Richard C.; and Guagliardo, John L., 4,890,075, Cl. 330-4.300.

Honeywell Inc.: *See—*
Kirk, David L., 4,890,222, Cl. 364-200.000.
Mathias, Milton W.; and Wilda, Douglas W., 4,888,992, Cl. 73-727.000.
Walker, Charles S., 4,890,021, Cl. 307-572.000.

Honma, Masayuki; and Masatate, Akihiko, to Nissan Motor Co., Ltd. Intake system for V-type multi-cylinder internal combustion engine. 4,889,083, Cl. 123-52.0MV.

Honore, Tage: *See—*
Jacobsen, Poul; Nielsen, Flemming E.; and Honore, Tage, 4,889,855, Cl. 514-250.000.

Hook, Jeffrey S.: *See—*
Dave, Jayant C.; Record, David W.; Nespor, Jill M.; and Hook, Jeffrey S., 4,889,726, Cl. 426-3.000.
Dave, Jayant C.; Record, David W.; Nespor, Jill M.; and Hook, Jeffrey S., 4,889,727, Cl. 426-3.000.

Hoover Company, The: *See—*
Crouser, Darwin S.; and Weber, Vincent L., 4,888,851, Cl. 15-371.000.

Hoppe, Bernd, to Sulzer-Escher Wyss Ag. Pusher centrifuge. 4,889,627, Cl. 210-360.200.

Hori, Tatsu: *See—*
Gardiner, Kenneth W.; Hori, Tatsu; and Mangal, Norman F., 4,890,135, Cl. 355-299.000.

Horigome, Shinkichi; Niihara, Toshio; Ohta, Norio; Sugita, Yutaka; Miyamura, Yoshinori; Sudo, Ryoichi; Miwa, Hiroaki; and Tajima, Tetsuo, to Hitachi, Ltd. Optical recording disk. 4,889,757, Cl. 428-64.000.

Horita, Yoshiyuki, to Yoshida Kogyo K.K. Water-tight slide fastener. 4,888,859, Cl. 24-389.000.

Horn, Rolf: *See—*
Kochy, Fritz; Neumann, Bernhard; and Horn, Rolf, 4,889,386, Cl. 297-359.000.

Hoshino, Yoshihiro: *See—*
Nagasawa, Kiyoshi; Ono, Kozo; Ogata, Kojiro; Murayama, Ken; and Hoshino, Yoshihiro, 4,888,878, Cl. 33-573.000.

Hoshino, Yukio: *See—*
Nakaniwa, Shinpei; Otani, Seiichi; Hamada, Toru; Osaki, Masanobu; Hoshino, Yukio; and Tomisawa, Naoki, 4,889,100, Cl. 123-492.000.

Hosoba, Hiroyuki: *See—*
Taneya, Mototaka; Takahashi, Kosei; Hayakawa, Toshiro; Matsui, Sadayoshi; Matsumoto, Mitsuhiro; and Hosoba, Hiroyuki, 4,890,293, Cl. 372-46.000.

Hosoi, Masayuki: *See—*
Ando, Hitoshi; Kashiwazaki, Takashi; Hosoi, Masayuki; and Fukushima, Atsuhiko, 4,890,233, Cl. 364-457.000.

Hosoi, Yuichi; and Miyahara, Junji, to Fuji Photo Film Co., Ltd. Method and apparatus for recording and reproducing electron microscope image. 4,889,990, Cl. 250-327.200.

Hosokawa, Tomiaki: *See—*
Kawai, Naoki; Hamamoto, Kouji; and Hosokawa, Tomiaki, 4,889,969, Cl. 219-130.510.

Hosonuma, Masashi: *See—*
Shimamune, Takayuki; and Hosonuma, Masashi, 4,889,685, Cl. 419-9.000.

Hosoya, Naoki: *See—*
Imai, Shin-ichi; and Hosoya, Naoki, 4,890,307, Cl. 377-60.000.

Hospal Industrie: *See—*
Chevallet, Jacques, 4,889,635, Cl. 210-646.000.

Hotomi, Hideo, to Minolta Camera Kabushiki Kaisha. Printing head for ink jet printer. 4,890,126, Cl. 346-140.00R.

Hou, Janpu; Chai, Bruce H.; Badding, David D.; West, Gary A.; and Marcus, Stephen L., to Allied-Signal Inc. Solid-state optical flame detector. 4,889,993, Cl. 250-365.000.

Houghten, Richard A.: *See*—
Shinnick, Thomas M.; Minden, Percy; and Houghten, Richard A., 4,889,800, Cl. 435-7.000.
Houghton, Christopher L.: *See*—
Hoyte, Lennox P. J.; and Houghton, Christopher L., 4,890,019, Cl. 307-475.000.
Howard, William J. Magazine. 4,888,900, Cl. 42-50.000.
Howe Technologies Corporation: *See*—
Laletin, William H., 4,890,065, Cl. 328-155.000.
Hoyte, Lennox P. J.; and Houghton, Christopher L., to Digital Equipment Corporation. Bilingual CMOS to ECL output buffer. 4,890,019, Cl. 307-475.000.
Hozumi, Kazuhiro; Arai, Masaru; and Saito, Yoshitane, to Kuroda Seiko Company Limited; and Nakamura Kiki Engineering Company Limited. Solenoid controlled valve. 4,889,164, Cl. 137-625.640.
Hrakas, Nicholaos K.: *See*—
Schaumann, Jon P.; Olander, Jitka V.; Hrakas, Nicholaos K.; and Feder, Joseph, 4,889,922, Cl. 530-413.000.
Hsu, Chia-Tsong. Cooler-dehumidifier-filter 3-in-one apparatus for treating compressed air. 4,889,544, Cl. 55-218.000.
Huang, Chao-Kuei. Rotary lock swtich for switching and resetting a computer. 4,890,006, Cl. 307-112.000.
Huang, Fu-chih, to Rorer Pharmaceutical Corporation. Bisimidazolinoamino derivatives as antiallergy compounds. 4,889,868, Cl. 514-392.000.
Huang, Mekking. Shirt folding machine. 4,889,264, Cl. 223-37.000.
Hubbell Incorporated: *See*—
Micco, Robert D.; and Williams, Howard M., Jr., 4,889,453, Cl. 408-1.00R.
Nuckolls, Joe A.; and Payne, Paul E., 4,890,041, Cl. 315-225.000.
Hudgins, Roger L.; and Hawkins, Steven E., to Conoco Inc. Microwave emulsion treater with controlled feed water content. 4,889,639, Cl. 210-739.000.
Hudson, Hank M.: *See*—
Campbell, Roy E.; Wilkinson, John D.; and Hudson, Hank M., 4,889,545, Cl. 62-24.000.
Hudspeth, Thomas; and Steinberg, Fritz, to Hughes Aircraft Company. Compensated microwave feed horn. 4,890,118, Cl. 343-786.000.
Huger, Alois: *See*—
Krieg, Aloisius; Huger, Alois; and Schnetter, Wolfgang, 4,889,918, Cl. 530-350.000.
Hughes Aircraft Company: *See*—
Benjamin, Roland J., 4,889,418, Cl. 350-486.000.
Bohner, John J.; and Conley, Peter L., 4,890,027, Cl. 310-328.000.
Cosner, Lane W., 4,889,780, Cl. 430-1.000.
Hudspeth, Thomas; and Steinberg, Fritz, 4,890,118, Cl. 343-786.000.
Leyden, Richard N.; Lawrence, Robert; and Elias, William E., 4,889,585, Cl. 156-630.000.
McMoore, Clarence J., Jr.; and Graham, Melba T., 4,889,295, Cl. 242-118.300.
Reinhardt, Victor S., 4,890,248, Cl. 364-574.000.
Hughes, Roger. Vehicle storage system. 4,889,377, Cl. 296-3.000.
Hughes Simulation Systems, Inc.: *See*—
Yen, Craig S., 4,890,249, Cl. 364-578.000.
Hugunin, Harvey W. All-weather golf driving range. 4,889,342, Cl. 273-176.00R.
Hulon, Walter C. Urine bottle with cap. 4,889,249, Cl. 215-230.000.
Hult, David R.; and Young, Jeffrey L., to Emerson Electric Co. Wheeled hand cart for wet/dry utility vacuum cleaner. 4,888,849, Cl. 15-327.00F.
Hung, Michael. Sliding rail construction for the rowing exercising machine. 4,889,281, Cl. 238-143.000.
Hunt Valve Company: *See*—
Zepernick, Dean E.; Olson, Donald R.; and Scott, Robert D., 4,889,153, Cl. 137-269.000.
Hunter, L. Wayne. Low torque ripple stepping motor controller circuit. 4,890,048, Cl. 318-696.000.
Hunter, Thomas A.: *See*—
Covington, Anne E.; Hunter, Thomas A.; and Dawes, Keith, 4,889,717, Cl. 428-304.400.
Hurley, John J.: *See*—
Hendixen, Arne B.; Bowen, William A.; Evans, Michael W.; Hurley, John J.; and Leslie, Samuel A., 4,890,315, Cl. 379-59.000.
Husted, Royce H. Automatic reciprocator with manifold and sleeve valve. 4,889,034, Cl. 91-218.000.
Hutcheson, J. Stanford; Lutz, Richard W.; Obrist, Paul A.; Flaugher, David J.; and Watts, Charles E., to University of North Carolina at Chapel Hill, The. Portable automated blood pressure monitoring apparatus and method. 4,889,132, Cl. 128-680.000.
Hutchinson: *See*—
Bouhours, Jean-Paul, 4,889,326, Cl. 267-140.100.
Hydro International Limited: *See*—
Lakatos, Daniel, 4,889,166, Cl. 137-813.000.
Hydro-Quebec: *See*—
Gervais, Pierre; Duval, Michel; and Giroux, Marcel, 4,889,965, Cl. 219-10.55M.
Hyodo, Haruhiko, to Minolta Camera Kabushiki Kaisha. Image projection device for use in slit exposure optical system. 4,890,137, Cl. 355-57.000.
Ichihara, Junichi, to Fujitsu Limited. Magnetic bias coil for a magneto-optical recording apparatus. 4,890,178, Cl. 360-114.000.
Ichikawa, Hajime: *See*—
Yomoto, Masahiko; Uehara, Makoto; Ichikawa, Hajime; and Kato, Shigeru, 4,890,245, Cl. 364-557.000.
Ichinomiya, Keizi; Okada, Kouichi; Itsuki, Yuji; and Tsuchikura, Kaname, to Nichia Kagaku Kogyo K.K. Light-emitting composition and fluorescent lamp. 4,890,033, Cl. 313-487.000.
ICI Americas Inc.: *See*—
Nelson, Richard V.; and Stephen, John F., 4,889,882, Cl. 524-100.000.
Phalangas, Charalambos J.; and Cleary, Thomas P., 4,889,947, Cl. 560-119.000.
Ide, Naoaki: *See*—
Egawa, Jiro; and Ide, Naoaki, 4,890,125, Cl. 346-160.000.
Igarashi, Hidesato: *See*—
Oshima, Katsuhide; Murai, Toshiaki; Sakurai, Hitoshi; Igarashi, Shuji; Hanagata, Haruo; and Igarashi, Hidesato, 4,889,602, Cl. 204-38.100.
Igarashi, Shuji: *See*—
Oshima, Katsuhide; Murai, Toshiaki; Sakurai, Hitoshi; Igarashi, Shuji; Hanagata, Haruo; and Igarashi, Hidesato, 4,889,602, Cl. 204-38.100.
Igenov: *See*—
Lara, Jean, 4,888,960, Cl. 62-298.000.
Iguchi, Shigeki: *See*—
Tsugei, Shinji; Iguchi, Shigeki; and Inoue, Tomohiro, 4,890,258, Cl. 364-900.000.
Ihara Chemical Industry Co., Ltd.: *See*—
Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; and Takahashi, Satoru, 4,889,552, Cl. 71-92.000.
Iida, Eiji, to GAC International, Inc. Orthodontic apparatus for attachment to a tooth. 4,889,485, Cl. 433-9.000.
Iida, Hajime; and Nakamura, Tadashi, to Takao Kinzoku Kogyo Co., Ltd. Plural welding rod welding apparatus. 4,889,967, Cl. 219-87.000.
Iida, Junichi: *See*—
Marumo, Chihiro; Toida, Yoichi; Nemoto, Masatsugu; Iida, Junichi; and Sakuma, Kenji, 4,888,984, Cl. 73-105.000.
Ikeda, Kiyosi: *See*—
Takao, Hiroyoshi; Tanimoto, Yoshio; and Ikeda, Kiyosi, 4,889,881, Cl. 524-91.000.
Ikeda, Minoru. Light aircraft for short-distance takeoff and landing. 4,889,297, Cl. 244-5.000.
Ikeda, Shuji; Nagasawa, Kouichi; Meguro, Satoshi; and Yamamoto, Sho, to Hitachi, Ltd. Semiconductor memory cell device with thick insulative layer. 4,890,148, Cl. 357-45.000.
Ikeda, Toshiki: *See*—
Nishiyama, Yukinori; Fujioka, Hideaki; Yamaguchi, Hisaaki; Ikeda, Toshiki; and Miyoshi, Keisuke, 4,889,093, Cl. 123-400.000.
Ikeda, Yoshiaki: *See*—
Takeuchi, Toyoaki; and Ikeda, Yoshiaki, 4,890,273, Cl. 369-45.000.
Ikeda, Yoshifumi: *See*—
Araki, Kazuhiko; Kuroda, Tsuyoshi; Uemori, Satoru; Moriguchi, Akihiko; and Ikeda, Yoshifumi, 4,889,857, Cl. 514-235.200.
Ikegawa, Akihiko; Ohashi, Yuichi; and Okazaki, Masaki, to Fuji Photo Film Co., Ltd. Silver halide photographic emulsion. 4,889,796, Cl. 430-549.000.
Ikezaki, Takashi: *See*—
Naitoh, Kazumi; Arakawa, Yoshiaki; Ikezaki, Takashi; Yabe, Shoji; Yokoyama, Yutaka; Hamaguchi, Yuichi; Roppongi, Yasunobu; and Hamaguchi, Yuichi, 4,889,536, Cl. 29-570.100.
Ikura, Michio: *See*—
Mikhlin, Josef A., deceased; Ikura, Michio; Kelly, James F.; and Capes, C. Edward, 4,889,538, Cl. 44-90.000.
Imai, Akira: *See*—
Akasaki, Yutaka; Tokita, Akihiko; Torikoshi, Kaoru; Imai, Akira; and Ishii, Touru, 4,889,924, Cl. 534-658.000.
Imai, Masaharu, to Olympus Optical Co., Ltd. Scanning pulse generating circuit. 4,890,308, Cl. 377-79.000.
Imai, Shin-ichi; and Hosoya, Naoki, to Kabushiki Kaisha Toshiba. Input circuit of charge transfer device. 4,890,307, Cl. 377-60.000.
Imaizumi, Hiraku: *See*—
Saito, Kiyokazu; and Imaizumi, Hiraku, 4,890,085, Cl. 336-192.000.
Imamura, Kazunori: *See*—
Hayano, Fuminori; Imamura, Kazunori; Murata, Sunao; and Kato, Kinya, 4,889,998, Cl. 250-563.000.
Imanaga, Eisuke. Electrically opening and closing faucet device. 4,889,315, Cl. 251-129.030.
Imanaka, Makoto: *See*—
Okada, Susumu; Imanaka, Makoto; Masui, Susumu; Obara, Takashi; Shinozaki, Masatoshi; and Tsunoyama, Kozo, 4,889,566, Cl. 148-2.000.
Indspec Chemical Corporation: *See*—
Durairaj, Bojayan; Peterson, Alex, Jr.; and Salee, Gideon, 4,889,891, Cl. 525-139.000.
Information Storage Devices: *See*—
Simko, Richard T., 4,890,259, Cl. 365-45.000.
Inohana, Haruyuki; Takaoka, Saburo; and Takada, Hideaki, to Pioneer Electronic Corporation; and Hitachi, Ltd. Waveform equalization circuit for a magnetic reproducing device. 4,890,170, Cl. 360-65.000.
Inomata, Kenichi: *See*—
Nakajima, Nobuyuki; Inomata, Kenichi; Moruta, Masaya; Yamaguchi, Toshio; and Eitai, Kazuo, 4,889,474, Cl. 417-295.000.
Inoue, Hajime; and Tanaka, Mikio, to Sanyo Electric Co., Ltd. Program scan apparatus for VTR utilizing picture-in-picture display. 4,890,168, Cl. 358-335.000.
Inoue, Keizo; Nomura, Hiroaki; and Okutani, Tetsuya, to Takeda Chemical Industries, Ltd. Glycerol derivatives, their production and use. 4,889,953, Cl. 564-293.000.

Inoue, Tadashi: *See*—
Yamaoka, Masayoshi; Tsutsui, Kiyomi; Inoue, Tadashi; and Takahashi, Toyoki, 4,888,993, Cl. 73-760.000.
Inoue, Tomohiro: *See*—
Tsugei, Shinji; Iguchi, Shigeki; and Inoue, Tomohiro, 4,890,258, Cl. 364-900.000.
Inoue, Yasuhiro: *See*—
Maeda, Yoshiyasu; Inoue, Yasuhiro; Uno, Toshiyuki; and Suzuki, Kazuyoshi, 4,888,945, Cl. 57-264.000.
Institut National de la Recherche Aronomique: *See*—
Buswell, John A.; and Odier, Etienne, 4,889,807, Cl. 435-192.000.
Institute of Rock & Soil Mechanics Academia Sinica, The: *See*—
Chu, Li, 4,890,084, Cl. 336-30.000.
Instituut Voor Bewaring en Verwerking Van Landbouwprodukten: *See*—
Cornelissen, Andreas H. W. M., 4,889,046, Cl. 99-546.000.
Intellicall, Inc.: *See*—
Hird, John A.; Owen, Lindsey D.; and Rice, Michael R., 4,890,317, Cl. 379-132.000.
InterCon Systems, Inc.: *See*—
Neidich, Douglas A., 4,889,496, Cl. 439-75.000.
International Baking Co., Inc.: *See*—
Mani, Daniel, 4,889,043, Cl. 99-450.200.
International Business Machines: *See*—
Champ, Robert B.; Shattuck, Meredith D.; and Stremel, Donald A., 4,889,784, Cl. 430-58.000.
Sato, Koichi; and Sawa, Tsutomu, 4,889,240, Cl. 209-534.000.
International Business Machines Corporation: *See*—
Anthias, Tefcros; Herrod, John A.; and Trees, George M., 4,890,257, Cl. 364-900.000.
Cook, Sherry A.; Gerstle, Patrick J.; Smith, David R.; and Stilz, Kathryn R., 4,889,439, Cl. 400-706.000.
Davari, Bijan; Ganin, Eti; Harame, David L.; and Sai-Halasz, George A., 4,889,819, Cl. 437-27.000.
Dawes, Antony J. O.; and Henson, Stephen R., 4,890,098, Cl. 340-721.000.
Dolivo, Francois B.; and Ungerboeck, Gottfried, 4,890,299, Cl. 375-18.000.
Heath, Chester A.; Jackson, Kevin M.; Judice, Darryl E.; and Pestonji, Hoshang R., 4,890,219, Cl. 364-200.000.
Jabusch, John D.; Kovacs, Linda A.; Plzak, Timothy G.; and Richardson, Robert R., 4,890,253, Cl. 364-736.500.
Klein, Klaus; Pollmann, Kurt; Schettler, Helmut; Schulz, Uwe; Wagner, Otto M.; and Zuehlke, Rainer, 4,890,238, Cl. 364-491.000.
Loeb, David J.; and Milliken, Keith R., 4,890,240, Cl. 364-513.000.
International Paper Company: *See*—
Lisnyansky, Khaim; and Blecha, William E., 4,889,599, Cl. 162-263.000.
Inuyama, Toshihiko; Kimizuka, Junichi; Kusano, Akihisa; Sato, Kaoru; and Soya, Takashi, to Canon Kabushiki Kaisha. Light quantity control device. 4,890,288, Cl. 372-31.000.
Inuzuka, Toshio; Hasegawa, Tsutomu; Tomikawa, Minato; and Aoki, Shigeru, to Nippon Glass Fiber Co., Ltd.; and Chiyoda Corporation. Prepreg sheet for flake lining and lining process using the same. 4,889,766, Cl. 428-324.000.
Irvine, Michael P.: *See*—
Markle, David R.; Crane, Barry C.; and Irvine, Michael P., 4,889,407, Cl. 350-96.290.
Irving, Michael G.: *See*—
Doddrell, David M.; and Irving, Michael G., 4,889,125, Cl. 128-653.000.
Doddrell, David M.; and Irving, Michael G., 4,889,126, Cl. 128-653.000.
Iseda, Kohei: *See*—
Taniguchi, Tomohiko; Iseda, Kohei; Okazaki, Koji; Amano, Fumio; and Unagami, Shigeyuki, 4,890,325, Cl. 381-34.000.
Ishihara, Yasuoki; Obato, Fumio; Sakai, Jun; and Natsume, Takeshi, to Hitachi Metals, Ltd.; and Honda Giken Kogyo K.K. Nodular cast iron having a high impact strength and process of treating the same. 4,889,687, Cl. 420-13.000.
Ishii, Kazuaki; Futatsugi, Toshiro; Oshima, Toshio; Fujii, Toshio; Yokoyama, Naoki; and Shibatomi, Akihiro, to Fujitsu Limited. Method of forming a high temperature stable ohmic contact to a III–V substrate. 4,889,831, Cl. 437-184.000.
Ishii, Koichi: *See*—
Nakagawa, Yaoko; and Ishii, Koichi, 4,890,220, Cl. 364-200.000.
Ishii, Shigemichi: *See*—
Ogou, Sunoo; Ishii, Shigemichi; Tagomori, Sadaaki; Fukushima, Takuo; and Hayashida, Yasumasa, 4,889,312, Cl. 249-216.000.
Ishii, Touru: *See*—
Akasaki, Yutaka; Tokita, Akihiko; Torikoshi, Kaoru; Imai, Akira; and Ishii, Touru, 4,889,924, Cl. 534-658.000.
Ishii, Tsutomu: *See*—
Oda, Kengo; Ishii, Tsutomu; Fukushi, Yukiharu; Enomoto, Yuji; Nishida, Makoto; and Hojo, Yoshikata, 4,889,551, Cl. 71-88.000.
Ishikawa, Hirokuni: *See*—
Matsubara, Chiaki; Ishikawa, Hirokuni; and Ojima, Masao, 4,890,186, Cl. 361-103.000.
Ishikawa, Masaru: *See*—
Izawa, Minoru; Hamamoto, Tadanao; Ishikawa, Masaru; Dohke, Harumi; and Nakano, Tasuku, 4,890,037, Cl. 315-77.000.
Ishikawa, Takayuki: *See*—
Wada, Mitsuo; Kanoe, Toshio; and Ishikawa, Takayuki, 4,889,886, Cl. 524-449.000.
Ishikawa, Toshiuyki: *See*—
Takahashi, Takeshi; Nakamura, Masatake; Yabana, Yoshiji; Ishikawa, Toshiuyki; and Nagata, Koji, 4,889,958, Cl. 174-35.0MS.
Ishikura, Kazuo, to Nikkiso Co., Ltd. Submerged type pump. 4,889,468, Cl. 415-146.000.
Ishizaki, Kosho: *See*—
Hashimoto, Ichiro; Ishizaki, Kosho; Hayashida, Hiroshi; and Miyashita, Kunio, 4,890,024, Cl. 310-49.00R.
Ishizuka, Hiromi, to NEC Corporation. Spindle motor control system for magnetic disk apparatus. 4,890,045, Cl. 318-608.000.
Isoardi, Patrick: *See*—
Lehmann, Jean-Philippe; and Isoardi, Patrick, 4,890,255, Cl. 364-900.000.
Isobloc GmbH: *See*—
Aust, Aloys; Tiroux, Josef; and Weissenfels, Franz, 4,889,875, Cl. 521-123.000.
Isozumi, Shuzoo, to Mitsubishi Denki Kabushiki Kaisha. Electric motor with commutator directly molded on motor shaft and method of construction. 4,890,026, Cl. 310-233.000.
Itagaki, Shuichi: *See*—
Ono, Shuichi; Itagaki, Shuichi; and Yahagi, Masahiro, 4,889,837, Cl. 501-139.000.
Ito, Kenzo: *See*—
Takanabe, Kazunori; Yamamoto, Masaki; Ito, Kenzo; and Fujinami, Hiroshi, 4,890,104, Cl. 340-995.000.
Itoh, Sumio, to Fujitsu Limited. Memory access control apparatus having empty real address storing memory and logical address/reat address pair storing memory. 4,890,226, Cl. 364-200.000.
Itsuki, Yuji: *See*—
Ichinomiya, Keizi; Okada, Kouichi; Itsuki, Yuji; and Tsuchikura, Kaname, 4,890,033, Cl. 313-487.000.
ITT Corporation: *See*—
Bertrand, John; and Noah, Matthew J., 4,890,327, Cl. 381-38.000.
Iwamura, Masahiro: *See*—
Masuda, Ikuro; Kato, Kazuo; Sasayama, Takao; Nishio, Yoji; Kuboki, Shigeo; and Iwamura, Masahiro, 4,890,017, Cl. 307-446.000.
Iwasaki, Shizuo: *See*—
Oshima, Kazuo; and Iwasaki, Shizuo, 4,889,174, Cl. 152-529.000.
Iwata, Akihiko: *See*—
Nishimae, Junichi; Yoshizawa, Kenji; Taki, Masakazu; Ueda, Yoshihiro; Yanagi, Tadashi; and Iwata, Akihiko, 4,890,294, Cl. 372-57.000.
Iwata, Takahiro, to Honda Giken Kogyo Kabushiki Kaisha. System for controlling an internal combustion engine for motor vehicles equipped with an automatic transmission. 4,889,014, Cl. 74-858.000.
Iwata, Yasuo; Mae, Shigenori; Urai, Yoshio; and Tsunoda, Takayuki, to Toyota Jidosha Kabushiki Kaisha. Aluminium alloy having an excellent forgiability. 4,889,557, Cl. 75-249.000.
IXYS Corporation: *See*—
Arcus, Christopher G., 4,890,013, Cl. 307-355.000.
Izawa, Minoru; Hamamoto, Tadanao; Ishikawa, Masaru; Dohke, Harumi; and Nakano, Tasuku, to Toyota Jidosha Kabushiki Kaisha; and Kabushiki Kaisha Tokai Rika Denki Seisakusho. Apparatus for controlling a vehicle headlamp. 4,890,037, Cl. 315-77.000.
Izawa, Susumu: *See*—
Akiyama, Hiroyuki; Izawa, Susumu; Kuwabara, Hideki; and Yamaguchi, Toru, 4,889,671, Cl. 264-53.000.
Izenour, George C., to Lehigh University. Stage lighting apparatus. 4,890,208, Cl. 362-294.000.
Izumi, Tatsuro: *See*—
Fujino, Akihiko; Ootsuka, Hiroshi; and Izumi, Tatsuro, 4,890,134, Cl. 354-442.000.
Izunaga, Yasushi; Kuno, Hiroaki; and Sado, Shintaro, to Hatachi, Ltd. Mechanism for prevention of burning of bearing portions in a hermetic type scroll compressor. 4,889,471, Cl. 417-32.000.
J. I. Case Company: *See*—
Hagarty, Jon R., 4,889,203, Cl. 180-69.240.
J. R. Microwave, Inc.: *See*—
Merenda, Joseph T., 4,889,179, Cl. 165-14.000.
Jaafar, Hamedo A.; Katzor, Karl A.; Rethage, Wilbert B.; Pompa, Gerard A.; Dailey, George F.; and Guenther, Paul, to Westinghouse Electric Corp. Electric generator inspection system and motor controller. 4,889,000, Cl. 73-865.800.
Jabusch, John D.; Kovacs, Linda A.; Plzak, Timothy G.; and Richardson, Robert R., to International Business Machines Corporation. Predetermination of result conditions of decimal operations. 4,890,253, Cl. 364-736.500.
Jackowski, Bruno: *See*—
Hantz, Dominique; Antoine, Dominique; and Jackowski, Bruno, 4,889,042, Cl. 99-340.000.
Jackson, Delbert D.: *See*—
Buzza, Edmund E.; and Jackson, Delbert D., 4,888,998, Cl. 73-864.210.
Jackson, Kevin M.: *See*—
Heath, Chester A.; Jackson, Kevin M.; Judice, Darryl E.; and Pestonji, Hoshang R., 4,890,219, Cl. 364-200.000.
Jackson, Philip, to E. Beaudrey & Cie. Filter panel with parallel passages and mechanical filter screen comprising same. 4,889,629, Cl. 210-401.000.
Jacobsen, Niels: *See*—
Moller, Jens T.; Jacobsen, Niels; Nielsen, Kirsten K.; and Rasmussen, Stig, 4,889,698, Cl. 423-210.000.

Jacobsen, Poul; Nielsen, Flemming E.; and Honore, Tage, to A/S Ferrosan. Heterocyclic compounds and their preparation and use. 4,889,855, Cl. 514-250.000.
Jacomini, Omar J., to Westinghouse Electric Corp. Second time around clutter cancellation system. 4,890,113, Cl. 342-163.000.
Jaeger, Charles W.; Titterington, Donald R.; Le, Hu P.; and Sopko, Jeffrey J., to Tektronix, Inc. Phase change ink composition and phase change ink produced therefrom. 4,889,560, Cl. 106-27.000.
Jaeger, Wayne: *See—*
Titterington, Donald R.; Anderson, Jeffrey J.; Rise, James D.; and Jaeger, Wayne, 4,889,761, Cl. 428-195.000.
Jagode, Fritz H.: *See—*
Bartling, Werner; and Jagode, Fritz H., 4,888,884, Cl. 34-32.000.
Jahnke, Frederick C., to Texaco Inc. Partial oxidation process. 4,889,657, Cl. 252-373.000.
James Hardie Building Products Pty. Limited: *See—*
Hemsley, Stephen T.; and Roszowski, Bogdan, 4,889,287, Cl. 239-498.000.
Jamieson, Gene: *See—*
Rocklage, Scott M.; Cacheris, William P.; and Jamieson, Gene, 4,889,931, Cl. 540-465.000.
Jamiolkowski, Dennis D.; Gaterud, Mark T.; Newman, Hugh D., Jr.; and Shalaby, Shalaby W., to Ethicon, Inc. Surgical fastener made from glycolide-rich polymer blends. 4,889,119, Cl. 606-220.000.
Jamrozy, Richard E.; and Wilczynski, James M., to Thrall Car Manufacturing Company. Railroad car for container transport. 4,889,055, Cl. 105-355.000.
Janecke, James P., to Applied Power Inc. Compensated individual segment flow regulator. 4,889,161, Cl. 137-596.000.
Janiszewski, Grzegorz; Sahlmen, Thomas; and Nystrom, Mats, to Ab Volvo. Motor vehicle clutch for a mechanical, multiple-speed automatic transmission. 4,889,217, Cl. 192-48.910.
Janome Sewing Machine Industry Co., Ltd.: *See—*
Orii, Akira, 4,889,062, Cl. 112-318.000.
Janotik, Adam M.: *See—*
Strosberg, Gordon G.; Janotik, Adam M.; and Gentle, Derek F., 4,888,919, Cl. 49-502.000.
Jansen, Cornelis J. A., to U.S. Philips Corp. Enciphering/deciphering method and arrangement for performing the method. 4,890,324, Cl. 380-43.000.
Japan as represented by Director General of Agency of Industrial Science and Technology: *See—*
Sata, Nobuhiro, 4,889,745, Cl. 427-12.000.
Japan Electronic Control Systems Company, Limited: *See—*
Nakaniwa, Shinpei; Otani, Seiichi; Hamada, Toru; Osaki, Masanobu; Hoshino, Yukio; and Tomisawa, Naoki, 4,889,100, Cl. 123-492.000.
Tomishawa, Naoki, 4,889,099, Cl. 123-489.000.
Japan Styrene Paper Corporation: *See—*
Akiyama, Hiroyuki; Izawa, Susumu; Kuwabara, Hideki; and Yamaguchi, Toru, 4,889,671, Cl. 264-53.000.
Japan Tobacco Inc.: *See—*
Tateno, Atsushi; and Mashiko, Kimio, 4,889,144, Cl. 131-337.000.
Jenkinson, Jeffrey A. Dental mask. 4,889,490, Cl. 433-136.000.
Jensen, George A.; Nelson, David A.; and Molton, Peter M., to Battelle Memorial Institute. Radioluminescent light sources, tritium containing polymers, and methods for producing the same. 4,889,660, Cl. 252-646.000.
Jensen, Marvin E.: *See—*
Metz, Michael; Tokarz, Joseph S.; and Jensen, Marvin E., 4,889,532, Cl. 604-330.000.
Jeuch, Pierre, to Commissiriat a L'Energie Atomique. Process for the production of electrical isolation zones in a CMOS integrated circuit. 4,889,828, Cl. 437-34.000.
Jindai, Hideo; Bando, Keiji; Yoshida, Masakazu; and Yamada, Hideki, to Kabushiki Kaisha Komatsu Seisakusho. Control device for a power shovel. 4,889,466, Cl. 414-694.000.
Jodden, Klaus: *See—*
Kolkmann, Friedrich; and Jodden, Klaus, 4,889,702, Cl. 423-323.000.
Johansen, Edgar; and Johnsen, Hans K. Apparatus for testing of fluids. 4,888,981, Cl. 73-60.100.
Johansson, Eric B., to General Electric Company. Hydraulic reinforcement of channel at lower tie-plate in BWR fuel bundle. 4,889,684, Cl. 376-444.000.
John Crane-Houdaille, Inc.: *See—*
Amundson, Donald E.; Hamaker, Jon B.; Pecht, Glenn G.; and Sedy, Josef, 4,889,348, Cl. 277-1.000.
John Deere Technologies International, Inc.: *See—*
Berkowitz, Murray; and Abraham, John, 4,889,091, Cl. 123-219.000.
John Wyeth & Brother Limited: *See—*
Crossley, Roger, 4,889,846, Cl. 514-150.000.
John Wyeth & Brotyher Limited: *See—*
Shepherd, Robin G.; Chai, Sie-Yearl; Lichty, Maynard E.; and Milowsky, Arnold S., 4,889,936, Cl. 548-149.000.
Johns Hopkins University: *See—*
Lam, Veronica Y.; and Lam, Wing-Chee, 4,890,313, Cl. 378-189.000.
Packard, Beverly; Edidin, Michael; and Komoriya, Akira, 4,889,916, Cl. 525-54.100.
Johnsen, Hans K.: *See—*
Johansen, Edgar; and Johnsen, Hans K., 4,888,981, Cl. 73-60.100.
Johnson, Brion; Kesti, Michael R.; and Reynolds, Keith Y., to Grass Valley Group, Inc. Interrupting a transition sequence between video sources. 4,890,163, Cl. 358-181.000.
Johnson, Bruce E.; and Tsang, Paul, to Magnetic Peripherals Inc. On-the-fly error correction. 4,890,287, Cl. 371-37.200.
Johnson, Ivy D.: *See—*
Chin, Arthur A.; Johnson, Ivy D.; Kresge, Charles T.; and Sarli, Michael S., 4,889,615, Cl. 208-113.000.
Johnston, Vaughn R. Diverter apparatus. 4,889,196, Cl. 175-209.000.
Johoku Industries Ltd.: *See—*
Yamazaki, Takashi, 4,889,759, Cl. 428-181.000.
Jones, Danny C., to Star Beam, Inc. Remote controlled spotlight system. 4,890,207, Cl. 362-233.000.
Jones, Deryl K. Folding chair. 4,889,383, Cl. 297-16.000.
Jones, Jacqueline. Stranded motorist distress sign. 4,888,893, Cl. 40-592.000.
Jones, James M.: *See—*
Weaver, Kim A.; Jones, James M.; and Thibault, Joseph A., 4,889,149, Cl. 137-1.000.
Jones, Timothy A.; and Snavely, Earl S., Jr., to Mobil Oil Corporation. Process for oxidizing multivalent metals. 4,889,701, Cl. 423-220.000.
Joos, Heinz: *See—*
Krenkel, Bernhard; and Joos, Heinz, 4,889,674, Cl. 264-130.000.
Joppien, Hartmut: *See—*
Wegner, Peter; Kruger, Hans-Rudolf; Baumert, Dietrich; and Joppien, Hartmut, 4,889,870, Cl. 514-429.000.
Journomat AG.: *See—*
Schlumpf, Alois, 4,889,221, Cl. 194-345.000.
Judd, Thomas H.; and Smoot, Lanny S., to Bell Communications Research, Inc. Teleconference facility with high resolution video display. 4,890,314, Cl. 379-53.000.
Judice, Darryl E.: *See—*
Heath, Chester A.; Jackson, Kevin M.; Judice, Darryl E.; and Pestonji, Hoshang R., 4,890,219, Cl. 364-200.000.
Juillerat, Pierre: *See—*
Geiser, Markus; and Juillerat, Pierre, 4,889,024, Cl. 82-127.000.
Jujo Paper Co., Ltd.: *See—*
Murakami, Koji; Nakatsubo, Fumiaki; Katsura, Yoshiaki; and Matukura, Motoo, 4,889,927, Cl. 536-18.600.
Julien, Edmond: *See—*
Aurelle, Yves; Bernasconi, Christian; Besombes-Vailhe, Jean; Julien, Edmond; and Roques, Henri, 4,889,537, Cl. 44-53.000.
Julius Blum Gesellschaft M.B.H.: *See—*
Rock, Erich; Rupprechter, Helmut; and Brustle, Klaus, 4,888,853, Cl. 16-240.000.
Jung, Peter: *See—*
Esser, Wolfgang; and Jung, Peter, 4,890,095, Cl. 340-657.000.
Jung, Tae-Sung: *See—*
Kim, Byung-Youn; Park, Yong-Bo; and Jung, Tae-Sung, 4,890,051, Cl. 323-313.000.
Junk, Paul B.: *See—*
Wortberg, Johannes; Junk, Paul B.; and Franke, Harry, 4,889,477, Cl. 425-133.100.
Justice, James C.; and Delli-Gatti, Frank A., Jr., to Coaltex, Inc. Advance/retreat cutting miner and method. 4,889,392, Cl. 299-18.000.
K. W. Thompson Tool Co., Inc.: *See—*
French, Kendrick L.; and Laney, Mark C., 4,888,901, Cl. 42-51.000.
Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo: *See—*
Maeda, Masao; Fukuse, Michiyo; Miyaaki, Tohru; and Miyake, Toshio, 4,889,728, Cl. 426-5.000.
Kabushiki Kaisha Kobe Seiko: *See—*
Fujiwara, Tadayoshi; Yamaoka, Yukio; Hamada, Kazuichi; Yamada, Yoshiro; Kawaguchi, Yasunobu; Oki, Yasuhiro; Taniguchi, Takashi; and Takahashi, Hiroyuki, 4,889,567, Cl. 148-12.00B.
Kabushiki Kaisha Komatsu Seisakusho: *See—*
Jindai, Hideo; Bando, Keiji; Yoshida, Masakazu; and Yamada, Hideki, 4,889,466, Cl. 414-694.000.
Oguri, Hideo, 4,889,080, Cl. 123-41.82R.
Kabushiki Kaisha Machida Seisakusho: *See—*
Watanabe, Yoshio, 4,889,106, Cl. 128-4.000.
Kabushiki Kaisha Tokai Rika Denki Seisakusho: *See—*
Izawa, Minoru; Hamamoto, Tadanao; Ishikawa, Masaru; Dohke, Harumi; and Nakano, Tasuku, 4,890,037, Cl. 315-77.000.
Kabushiki Kaisha Toshiba: *See—*
Ando, Hideo, 4,890,272, Cl. 369-45.000.
Egawa, Jiro; and Ide, Naoaki, 4,890,125, Cl. 346-160.000.
Haragashira, Motoji, 4,890,062, Cl. 324-322.000.
Haragashira, Motoji, 4,890,063, Cl. 324-322.000.
Hirahara, Shuzo; Nagato, Hitoshi; Higuchi, Kazuhiko; Yamada, Kiyoshi; Ohno, Tadayoshi; and Kanai, Tsutomu, 4,890,121, Cl. 346-76.0PH.
Imai, Shin-ichi; and Hosoya, Naoki, 4,890,307, Cl. 377-60.000.
Miyoshi, Motosuke; and Okumura, Katsuya, 4,890,029, Cl. 313-7.000.
Ono, Takuro; Aoyama, Noboru; and Morinaga, Kaoru, 4,890,276, Cl. 369-77.200.
Seki, Nagataka, 4,890,213, Cl. 363-49.000.
Tanaka, Fuminari; and Nonaka, Satoshi, 4,890,016, Cl. 307-443.000.
Kabushiki Kaisha Toyota Chuo Kenkyusho: *See—*
Usuki, Arimitsu; Mizutani, Tadashi; Fukushima, Yoshiaki; Fujimoto, Megumi; Fukumori, Kenzo; Kojima, Yoshitsugu; Sato, Norio; Kurauchi, Toshio; and Kamigaito, Osami, 4,889,885, Cl. 524-445.000.
Kabushiki Kaisha Universal: *See—*
Okada, Kazuo, 4,889,339, Cl. 273-143.00R.
Kabushiki-Kaisha Yamau: *See—*
Kawasaki, Masaki, 4,889,666, Cl. 264-22.000.

Kabushiki Kaisha Yaskawa Denki Seisakusho: *See*—
Matsubara, Chiaki; Ishikawa, Hirokuni; and Ojima, Masao, 4,890,186, Cl. 361-103.000.

Kageyama, Shigeki: *See*—
Amano, Yoshikazu; Kageyama, Shigeki; and Katsuyama, Harumi, 4,889,797, Cl. 435-4.000.

Kai, Masanobu; and Chiku, Etsuko, to Kao Corporation. Composition for antiperspirant aerosol. 4,889,711, Cl. 424-47.000.

Kaifu, Katsuaki; Kosuge, Maki; Yamashita, Yoshio; Asano, takateru; and Kobayashi, Kenji, to Oki Electric Industry Co., Ltd.; and Fuji Chemicals Industrial Co., Ltd. Process for forming photoresist pattern using contrast enhancement layer with abietic acid. 4,889,795, Cl. 430-326.000.

Kaiser, Helmut: *See*—
Zeiser, Peter; Kaiser, Helmut; and Rieger, Hansjorg, 4,889,172, Cl. 152-226.000.

Kaiser, Klaus, to Seitz Enzinger Noll Maschinenbau Aktiengesellschaft. Method and filtration apparatus for purifying solvents. 4,889,642, Cl. 210-771.000.

Kalck, Philippe: *See*—
Besson, Bernard; Kalck, Philippe; and Thorez, Alain, 4,889,957, Cl. 568-454.000.

Kameda, Masahiro; Kamei, Yojiro; and Kurihara, Kenichi, to Ricoh Company, Ltd. Thin-film and its forming method. 4,890,151, Cl. 357-65.000.

Kamei, Yojiro: *See*—
Kameda, Masahiro; Kamei, Yojiro; and Kurihara, Kenichi, 4,890,151, Cl. 357-65.000.

Kamigaito, Osami: *See*—
Usuki, Arimitsu; Mizutani, Tadashi; Fukushima, Yoshiaki; Fujimoto, Megumi; Fukumori, Kenzo; Kojima, Yoshitsugu; Sato, Norio; Kurauchi, Toshio; and Kamigaito, Osami, 4,889,885, Cl. 524-445.000.

Kamiya, Haruo: *See*—
Hashizume, Yoshikazu; and Kamiya, Haruo, 4,889,314, Cl. 251-129.020.

Kampen, Jan-Dieter; and Schroder, Karl-Friedrich, to Kolbus GmbH & Co. KG. Wrapping apparatus for a book cover production machine. 4,889,461, Cl. 412-19.000.

Kanai, Tsutomu: *See*—
Hirahara, Shuzo; Nagato, Hitoshi; Higuchi, Kazuhiko; Yamada, Kiyoshi; Ohno, Tadayoshi; and Kanai, Tsutomu, 4,890,121, Cl. 346-76.0PH.

Kanamori, Osamu, to Mitsubishi Denki Kabushiki Kaisha. Balustrade structure for curved escalator. 4,889,222, Cl. 198-328.000.

Kanebo, Ltd.: *See*—
Maeda, Masao; Fukuse, Michiyo; Miyaaki, Tohru; and Miyake, Toshio, 4,889,728, Cl. 426-5.000.

Kaneda, Hiroyuki: *See*—
Takeda, Akihiko; Kaneda, Hiroyuki; and Suzuki, Shigeru, 4,889,079, Cl. 123-41.82R.

Kaneko, Nobuyuki; and Kato, Kiichi, to Olympus Optical Co., Ltd. Optical information recording and reproducing apparatus. 4,890,274, Cl. 369-45.000.

Kania, Bruce. Shock absorber for a bow mounted camera. 4,890,128, Cl. 354-76.000.

Kanoe, Toshio: *See*—
Wada, Mitsuo; Kanoe, Toshio; and Ishikawa, Takayuki, 4,889,886, Cl. 524-449.000.

Kansai Chemical engineering Co., Ltd.: *See*—
Tazawa, Toshiaki; Yotsumoto, Masahiro; Tanahashi, Hiroshi; and Wakabayashi, Yuzuru, 4,889,743, Cl. 426-495.000.

Kansai Paint Co., Ltd.: *See*—
Adaniya, Takeshi; Yamashita, Masaaki; Kubota, Takahiro; Enatsu, Akira; Nikaido, Norio; Miyosawa, Yoshiaki; and Nishimoto, Tadashi, 4,889,775, Cl. 428-62.00B.

Kao Corporation: *See*—
Kai, Masanobu; and Chiku, Etsuko, 4,889,711, Cl. 424-47.000.

Kapoor, Kishore K.: *See*—
Chalmers, Brian D.; Mackenzie, Colin A.; and Kapoor, Kishore K., 4,890,174, Cl. 360-78.120.

Karl, Heinz-Dietmar; Tinebor, Manfred; and Lackhove, Josef, to Lenze GmbH & Co. KG Aerzen. Circuit for protecting a switching transistor. 4,890,185, Cl. 361-91.000.

Karlsson, Kurt O.; and Karlsson, Leif E., to Sandvik AB. Drill. 4,889,455, Cl. 408-188.000.

Karlsson, Leif E.: *See*—
Karlsson, Kurt O.; and Karlsson, Leif E., 4,889,455, Cl. 408-188.000.

Karol, Thomas J.: *See*—
Rowan, Eugene V.; Karol, Thomas J.; and Farmer, Homer H., 4,889,647, Cl. 252-42.700.

Karstensen, Holger: *See*—
Klement, Ekkehard; Schneider, Hartmut; Karstensen, Holger; and Zrschizky, Helmut, 4,889,401, Cl. 350-96.120.

Kasahara, Chiyoshi: *See*—
Oku, Teruo; Todo, Eishiro; Kasahara, Chiyoshi; Nakamura, Katsuya; and Kayakiri, Hiroshi, 4,889,851, Cl. 514-223.200.

Kasai, Kazumi, to Yoshida Kogyo K.K. Buckle assembly. 4,888,858, Cl. 24-163.00R.

Kasamatsu, Kiyoshi: *See*—
Ohtsubo, Toshiro; Tsuda, Shigenori; Manabe, Yukio; Kasamatsu, Kiyoshi; Takeda, Hisami; and Tsuji, Kozo, 4,889,719, Cl. 424-408.000.

Kasan, Rodney; Seiffe, Michael; and Yellin, Haim, to Teva Pharmaceutical Industries Ltd. Stable aqueous cisplatin solutions. 4,889,724, Cl. 424-649.000.

Kasei Optonix, Ltd.: *See*—
Kotera, Noboru; Eguchi, Shusaku; and Miura, Norio, 4,889,996, Cl. 250-484.100.

Kashiwazaki, Takashi: *See*—
Ando, Hitoshi; Kashiwazaki, Takashi; Hosoi, Masayuki; and Fukushima, Atsuhiko, 4,890,233, Cl. 364-457.000.

Kaspi, Joseph: *See*—
Vaya, Jacob; Ladkani, David; Schoenberger, Clara; Kaspi, Joseph; Salemnick, Gad; Yellin, Haim; and Cherkez, Stephan, 4,889,929, Cl. 540-318.000.

Kassbohrer of North America, Inc.: *See*—
Haug, Walter, 4,888,891, Cl. 37-222.000.

Kataoka, Sachiro: *See*—
Kurozu, Tomotaka; and Kataoka, Sachiro, 4,890,038, Cl. 315-82.000.

Kato, Kazuo: *See*—
Masuda, Ikuro; Kato, Kazuo; Sasayama, Takao; Nishio, Yoji; Kuboki, Shigeo; and Iwamura, Masahiro, 4,890,017, Cl. 307-446.000.

Kato, Kiichi: *See*—
Kaneko, Nobuyuki; and Kato, Kiichi, 4,890,274, Cl. 369-45.000.

Kato, Kinya: *See*—
Hayano, Fuminori; Imamura, Kazunori; Murata, Sunao; and Kato, Kinya, 4,889,998, Cl. 250-563.000.

Kato, Shigeru: *See*—
Yomoto, Masahiko; Uehara, Makoto; Ichikawa, Hajime; and Kato, Shigeru, 4,890,245, Cl. 364-557.000.

Katoh, Hiroshi; Taguchi, Hiromi; and Kikunaga, Shoji, to Victor Company of Japan, Ltd. Guide drum assembly with built-in motor having floating rotor. 4,890,177, Cl. 360-107.000.

Katsura, Yoshiaki: *See*—
Murakami, Koji; Nakatsubo, Fumiaki; Katsura, Yoshiaki; and Matukura, Motoo, 4,889,927, Cl. 536-18.600.

Katsuyama, Harumi: *See*—
Amano, Yoshikazu; Kageyama, Shigeki; and Katsuyama, Harumi, 4,889,797, Cl. 435-4.000.

Katzor, Karl A.: *See*—
Jaafar, Hamedo A.; Katzor, Karl A.; Rethage, Wilbert B.; Pompa, Gerard A.; Dailey, George F.; and Guenther, Paul, 4,889,000, Cl. 73-865.800.

Kaufman, Jack W. Surgical retractor. 4,889,107, Cl. 128-20.000.

Kaufman, Theodore P.: *See*—
Bevill, Fred; and Kaufman, Theodore P., 4,889,097, Cl. 123-478.000.

Kaufmann, Dieter: *See*—
Enderle, Eckhard; Kaufmann, Dieter; Muller; and Andrzejewski, Thomas, 4,888,877, Cl. 33-559.000.

Kawabata, Takeo; Miyashita, Masahiko; and Taisha, Akira, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Organic mixed complex. 4,889,934, Cl. 546-151.000.

Kawaguchi, Kouji: *See*—
Miyama, Hidetoshi; Sugimoto, Masanori; and Kawaguchi, Kouji, 4,889,968, Cl. 219-121.700.

Kawaguchi, Yasunobu: *See*—
Fujiwara, Tadayoshi; Yamaoka, Yukio; Hamada, Kazuichi; Yamada, Yoshiro; Kawaguchi, Yasunobu; Oki, Yasuhiro; Taniguchi, Takashi; and Takahashi, Hiroyuki, 4,889,567, Cl. 148-12.00B.

Kawaguchi, Yukio; and Kineri, Tobru, to TDK Corporation. Thermistor materials and elements. 4,890,087, Cl. 338-22.00R.

Kawai, Naoki; Hamamoto, Kouji; and Hosokawa, Tomiaki, to Matsushita Electric Industrial Co., Ltd. Reduced-spatter pulse arc welding machine for use with a consumable electrode. 4,889,969, Cl. 219-130.510.

Kawai, Shinichi, to Fujitsu Limited. Method for producing a semiconductor device having a silicon-on-insulator structure. 4,889,829, Cl. 437-69.000.

Kawakami, Kazushi, to Tazmo Co., Ltd. Substrate coating equipment. 4,889,069, Cl. 118-50.000.

Kawamura, Hirotaka; Ohtsu, Norio; and Utiumi, Shinichiro, to Ube Industries, Ltd. Method for stabilizing aqueous phosphoenolpyruvic acid solution. 4,889,943, Cl. 558-71.000.

Kawano, Ryuji: *See*—
Fujita, Tomohiro; and Kawano, Ryuji, 4,889,395, Cl. 303-115.000.

Kawano, Shigeyoshi: *See*—
Fukayama, Yukio; Oshima, Taku; and Kawano, Shigeyoshi, 4,888,953, Cl. 60-657.000.

Kawara, Toshio: *See*—
Nadai, Tanekazu; and Kawara, Toshio, 4,889,528, Cl. 604-65.000.

Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Fujikawa, Tetsuzo; Hirata, Makizo; and Tamba, Shinichi, 4,889,089, Cl. 123-195.0HC.

Kawasaki, Masaki, to Kabushiki-Kaisha Yamau. Method for producing concrete products provided with inlaid patterns. 4,889,666, Cl. 264-22.000.

Kawasaki Steel Corporation: *See*—
Okada, Susumu; Imanaka, Makoto; Masui, Susumu; Obara, Takashi; Shinozaki, Masatoshi; and Tsunoyama, Kozo, 4,889,566, Cl. 148-2.000.

Kay, Paul O.: *See*—
Mohiuddin, Mahmood; Schneider, Barry L.; and Kay, Paul O., 4,889,534, Cl. 604-339.000.

Kayakiri, Hiroshi: *See*—
Oku, Teruo; Todo, Eishiro; Kasahara, Chiyoshi; Nakamura, Katsuya; and Kayakiri, Hiroshi, 4,889,851, Cl. 514-223.200.

Kaysersberg S.A.: *See*—
Hoeft, Benoit, 4,888,913, Cl. 47-9.000.

Keats, Richard L.: *See*—
Auer, Robert T.; Keats, Richard L.; and Chung, Jore M., 4,889,514, Cl. 446-230.000.

Keeffe, William M.; and Krasko, Zeya K., to GTE Products Corporation. Metal halide discharge lamp with arc tube temperature equalizing means. 4,890,030, Cl. 313-25.000.

Kei, Mori; Mitsuyuki, Kikyo; and Kouiti, Yabuki, to Kurashiki Kako Co., Ltd. Method for manufacturing rubber vibration insulator using a halogen compound solution. 4,889,578, Cl. 156-294.000.

Keijiro, Hayashi, to Mizuno Corporation. Racket frame. 4,889,338, Cl. 273-73.00G.

Keller, Helmut. Method for treating herpes and chronic inflammatory intestinal tract disease. 4,889,716, Cl. 424-195.100.

Kelley, Charles D.: *See*—
Sarrine, Robert J.; Garsee, Henry A.; Kelley, Charles D.; and Guadagno, Philip A., 4,890,247, Cl. 364-571.040.

Kelly, James D.: *See*—
Murray, Mark J.; and Kelly, James D., 4,889,919, Cl. 530-351.000.

Kelly, James F.: *See*—
Mikhlin, Josef A., deceased; Ikura, Michio; Kelly, James F.; and Capes, C. Edward, 4,889,538, Cl. 44-90.000.

Kelly, Thomas L. Sealed roof deck wind vacuum transfer system. 4,888,930, Cl. 52-410.000.

Kelsey, Christopher G., to Geoflow International Pty. Limited. Proportional flow control valve. 4,889,317, Cl. 251-212.000.

Kemeny, Matthias D. Portable display system. 4,888,895, Cl. 40-610.000.

Kemp, Daniel N., to Dow Corning Corporation. Fixed-volume, trapped rubber molding method. 4,889,668, Cl. 264-40.500.

Kemp, Paul: *See*—
Long, Michael; Palone, Thomas W.; and Kemp, Paul, 4,889,269, Cl. 226-97.000.

Kerr, Paul R.; Pettit, Paul H., Jr.; and Ewing, William S., to PPG Industries, Inc. Powder coating curing system containing a beta-hydroxyalkylamide. 4,889,890, Cl. 525-113.000.

Kerschbaum, Walter: *See*—
Werner, Johannes; Kerschbaum, Walter; and Heinrich, Rolf, 4,889,090, Cl. 123-197.0AC.

Kersey, Alan D.; and Dandridge, Anthony, to United States of America, Navy. Serial interferometric fiber-optic sensor array. 4,889,986, Cl. 250-227.000.

Kerttula, Reima, to Valmet Paper Machinery Inc. Drawing a web through a multi-cylinder drying section. 4,888,883, Cl. 34-116.000.

Kerzich, Anthony A.; and McClure, Douglas M., to Cadillac Rubber & Plastics, Inc. Tubing angle bend assembly clip. 4,889,168, Cl. 138-103.000.

Kesti, Michael R.: *See*—
Johnson, Brion; Kesti, Michael R.; and Reynolds, Keith Y., 4,890,163, Cl. 358-181.000.

Key, Ted G. Method and apparatus for the receiving of carbon black pellets for weighing prior to injection into a mixer which inhibits the accumulation of carbon black fines on internal surfaces. 4,889,219, Cl. 193-25.00R.

Khan, M. M. Taqui; and Bhardwaj, R. Chandra, to Council of Scientific & Industrial Research. Process for the photocatalytic decomposition of water into hydrogen and oxygen. 4,889,604, Cl. 204-157.500.

Kidwell, Michael H.: *See*—
Studebaker, Robert H.; Teach, Ted L.; and Kidwell, Michael H., 4,888,890, Cl. 37-103.000.

Kikuchi, Yasushi; and Matsuzawa, Hideki, to Fuji Photo Film Co., Ltd. Magnetic disk cleaning method and apparatus. 4,889,564, Cl. 134-21.000.

Kikunaga, Shoji: *See*—
Katoh, Hiroshi; Taguchi, Hiromi; and Kikunaga, Shoji, 4,890,177, Cl. 360-107.000.

Kildegaard, Ejvind: *See*—
Haumann, Klaus; and Kildegaard, Ejvind, 4,888,855, Cl. 17-1.00A.

Kilk, Erik; Smith, David A.; and Schmidt, Alan W., to Hewlett-Packard Company. Method and apparatus for aiding manual instrument settings by displaying estimates of future measurement results. 4,890,236, Cl. 364-485.000.

Killinger, Bernd, to Komet Stahlhalter- und Werkzeugfabrik Robert Breuning GmbH. Drilling tool for drilling in solid metal material, in particular for drilling in plate stacks. 4,889,456, Cl. 408-224.000.

Kim, Byung-Youn; Park, Yong-Bo; and Jung, Tae-Sung, to Samsung Electronics Co., Ltd. CMOS input buffer stable for the variation of a power supplying voltage. 4,890,051, Cl. 323-313.000.

Kim, Soonih; Takeda, Kazuhisa; and Sasatani, Seiei, to Ono Pharmaceutical Co., Ltd. Pharmaceutical compositions comprising esters or amides as active ingredients. 4,889,723, Cl. 424-450.000.

Kimizuka, Junichi: *See*—
Inuyama, Toshihiko; Kimizuka, Junichi; Kusano, Akihisa; Sato, Kaoru; and Soya, Takashi, 4,890,288, Cl. 372-31.000.

Kimura, Keita; Takatsu, Norihiko; and Yamamoto, Tetsuya, to Nikon Corporation. Exposure control device in an electronic still camera. 4,890,166, Cl. 358-228.000.

Kimura, Masatoshi, to Mitsubishi Denki Kabushiki Kaisha. Connecting mechanism for memory card. 4,889,495, Cl. 439-60.000.

Kindt-Larsen, Ture; Heaton, John C.; and Rastrelli, Edmund C., to Vistakon, Inc. Method of forming shaped hydrogel articles including contact lenses. 4,889,664, Cl. 264-2.600.

Kineri, Tobru: *See*—
Kawaguchi, Yukio; and Kineri, Tobru, 4,890,087, Cl. 338-22.00R.

Kinetico, Inc.: *See*—
Prior, William C.; Ellis, III: George S.; and Crozier, David W., 4,889,623, Cl. 210-190.000.

Kinoshita, Naoyoshi: *See*—
Miyamoto, Hirohisa; and Kinoshita, Naoyoshi, 4,890,138, Cl. 355-246.000.

Kinzler, Hans; and Kotowicz, Aleksander, to Siemens Aktiengesellschaft. Apparatus having a mechanical key and a transmitter for actuation of a lock system. 4,888,970, Cl. 70-456.00R.

Kioritz Corporation: *See*—
Ohkanda, Masao, 4,889,215, Cl. 192-48.100.

Kippenberg, Horst; Moser, Thomas; and Otto, Klaus, to Siemens Aktiengesellschaft. Filler layer electrical component and method for the manufacture thereof. 4,889,760, Cl. 428-192.000.

Kipphardt, Helmut: *See*—
Franke, Joachim; Goyert, Wilhelm; and Kipphardt, Helmut, 4,889,908, Cl. 521-115.000.

Kirk, David L., to Honeywell Inc. Apparatus for substantially syncronizing the timing subsystems of the physical modules of a local area network. 4,890,222, Cl. 364-200.000.

Kishimoto, Akihiko: *See*—
Kobayashi, Hirokazu; and Kishimoto, Akihiko, 4,889,893, Cl. 525-189.000.

Kita, Masahiro: *See*—
Negoro, Ikuo; and Kita, Masahiro, 4,890,140, Cl. 355-290.000.

Kite, Dolores N. Card file mirror. 4,889,419, Cl. 350-600.000.

KLA Instruments Corporation: *See*—
Rosenberg, Larry; Chadwick, Curt H.; and Brudny, Alex, 4,889,676, Cl. 264-255.000.

Klabin, Mauricio, to Mec-Prec Mecanica De Precisao Industria E Comercio Ltda. Safe for collecting public telephone tokens. 4,889,279, Cl. 232-15.000.

Kladders, Heinrich, to Boehringer Ingelheim KG. Powdered pharmaceutical inhaler. 4,889,114, Cl. 128-203.150.

Klamer, Albert: *See*—
Lugtmeier, Lubbertus; and Klamer, Albert, 4,889,184, Cl. 166-80.000.

Klansek, William. Bow hanger. 4,889,307, Cl. 248-690.000.

Klarstrom, Dwaine L., to Haynes International, Inc. Chemical reactor for nitric acid. 4,889,696, Cl. 422-211.000.

Klein, Klaus; Pollmann, Kurt; Schettler, Helmut; Schulz, Uwe; Wagner, Otto M.; and Zuehlke, Rainer, to International Business Machines Corporation. Method for physical VLSI-chip design. 4,890,238, Cl. 364-491.000.

Kleiner, Hans-Jerg, to Hoechst Aktiengesellschaft. Process for the preparation of aromatic phosphorus-chlorine compounds. 4,889,661, Cl. 562-815.000.

Kleinerman, George J.; and Woodcock, John M., to Porvair Limited. Gloves. 4,888,829, Cl. 2-167.000.

Kleinschmit, Peter: *See*—
Lotze, Marion; and Kleinschmit, Peter, 4,889,769, Cl. 428-432.000.

Klement, Ekkehard; Schneider, Hartmut; Karstensen, Holger; and Zrschizky, Helmut, to Siemens Aktiengesellschaft. Birefringent optical waveguide structure having a strip waveguide buried in a cladding layer and the method of manufacturing. 4,889,401, Cl. 350-96.120.

Klemmer, Herbert: *See*—
Senft, Ernst; Klemmer, Herbert; Uhl, Ullrich; Naumann, Emil; and Schefcsik, Nikolaus, 4,889,007, Cl. 74-506.000.

Kligman, Albert M.; Mezick, James A.; and Capetola, Robert J., to Ortho Pharmaceutical Corporation. Prevention of glucocorticoid-induced skin atrophy. 4,889,847, Cl. 514-171.000.

Klinge, Svein. Pleated knit fabric. 4,888,964, Cl. 66-193.000.

Klink, Norbert: *See*—
Prein, Franz; Wiegand, Jurgen; Frey, Peter; and Klink, Norbert, 4,890,035, Cl. 313-633.000.

Knab, Rochus: *See*—
Beyer, Hans-Ernst; Bonitz, Jorg; Entenmann, Robert; Forster, Siegmar; Knab, Rochus; Kunzel, Walter; Kugler, Wolfgang; Mahlberg, Alfred; Miller, Bernhard; Philipp, Matthias; Rohde, Siegfried; Unland, Stefan; Viess, Walter; Winter, Herbert; and Zimmermann, Jurgen, 4,889,094, Cl. 123-414.000.

Knebel, Joachim: *See*—
Besecke, Sigmund; Knebel, Joachim; Schroeder, Guenter; and Ude, Werner, 4,889,909, Cl. 528-125.000.

Knight, Harold W.; and Hale, David E. Game call. 4,888,903, Cl. 43-1.000.

Knowles, Carter L. Gun magazine loader. 4,888,902, Cl. 42-90.000.

Kobata, Tomokazu; and Matsui, Yosuke, to Bando Chemical Industries, Ltd. Electrophotographic light-sensitive material. 4,889,785, Cl. 430-59.000.

Kobayashi, Akira: *See*—
Tanihara, Masao; Oka, Kiichiro; Yamada, Hideaki; Kobayashi, Akira; Nakashima, Toshihide; Omura, Yoshiaki; and Takakura, Koichi, 4,889,917, Cl. 530-324.000.

Kobayashi, Hirokazu; and Kishimoto, Akihiko, to Toray Industries. Polyphenylene sulfide resin composition and a process for producing it. 4,889,893, Cl. 525-189.000.

Kobayashi, Hisataka; Araki, Fujio; and Ohtani, Yoshihiro, to Nippon Seiki Co., Ltd. Instrument with crossed-coil type movable magnet. 4,890,057, Cl. 324-140.00D.

Kobayashi, Kenji: *See*—
Kaifu, Katsuaki; Kosuge, Maki; Yamashita, Yoshio; Asano, takateru; and Kobayashi, Kenji, 4,889,795, Cl. 430-326.000.

Kobayashi, Tetsuo; and Hayakawa, Masaharu, to Mitsubishi Denki Kabushiki Kaisha. Magnetic tape recording and/or reproducing apparatus with slow motion effect. 4,890,169, Cl. 360-10.300.
Koch, Daniel: *See*—
Nicolet, Richard; and Koch, Daniel, 4,890,111, Cl. 342-51.000.
Koch, Franz P.: *See*—
Chehab, Firdausia; and Koch, Franz P., 4,888,977, Cl. 73-38.000.
Kochy, Fritz; Neumann, Bernhard; and Horn, Rolf. Rear seat for motor vehicles. 4,889,386, Cl. 297-359.000.
Kodai, Shiyoojiro: *See*—
Ohashi, Masato; and Kodai, Shiyoojiro, 4,889,749, Cl. 428-13.000.
Koffsky, Robert M.; and Pedersen, Finn S., to Affald International Inc. Waste disposal apparatus. 4,889,290, Cl. 241-36.000.
Koga, Yoichiro: *See*—
Yoshimi, Satoshi; and Koga, Yoichiro, 4,888,927, Cl. 52-303.000.
Koike, Naomasa: *See*—
Kosaka, Takao; Miyauchi, Masahiro; Koike, Naomasa; and Higuchi, Masahiro, 4,889,841, Cl. 503-209.000.
Koizumi, Hideaki: *See*—
Takeda, Ryuzaburo; Koizumi, Hideaki; and Miyamoto, Yoshiyuki, 4,889,127, Cl. 128-653.000.
Kojima, Akio: *See*—
Sawai, Kiichi; Kurono, Masayasu; Awaya, Juichi; Kojima, Akio; and Ninomiya, Hideaki, 4,889,715, Cl. 424-80.000.
Kojima, Hisashi; and Miyagi, Tatsuo, to Technoplas Inc. Method for supervision of injection molding by use of waveform of internal die pressure. 4,889,667, Cl. 264-40.100.
Kojima, Yoshitsugu: *See*—
Usuki, Arimitsu; Mizutani, Tadashi; Fukushima, Yoshiaki; Fujimoto, Megumi; Fukumori, Kenzo; Kojima, Yoshitsugu; Sato, Norio; Kurauchi, Toshio; and Kamigaito, Osami, 4,889,885, Cl. 524-445.000.
Kokan Mining Co., Ltd.: *See*—
Fukushima, Tsutomu; Nakao, Tsugio; Yamashita, Kasane; Komuro, Takao; and Nishi, Katsuhiro, 4,889,697, Cl. 423-140.000.
Kokusai Denki Kabushiki Kaisha: *See*—
Sasaki, Kanemi, 4,890,079, Cl. 333-206.000.
Kolbus GmbH & Co. KG: *See*—
Kampen, Jan-Dieter; and Schroder, Karl-Friedrich, 4,889,461, Cl. 412-19.000.
Kolinske, Edmund C.; and Uuskallio, Arvo F., to Briggs & Stratton Corporation. Engine speed control cable clip attachment. 4,889,006, Cl. 74-502.400.
Kolkmann, Friedrich; and Jodden, Klaus, to Hoechst Aktiengesellschaft. Process for removing metallic constituents from dust obtained during the electrothermal production of yellow phosphorus. 4,889,702, Cl. 423-323.000.
Kolobow, Theodor, to United States of America, Health and Human Services. Method for improved use of heart/lung machine. 4,889,137, Cl. 128-898.000.
Komata, Shinji. Power transmission device. 4,889,518, Cl. 464-102.000.
Komatsu, Yasuji: *See*—
Yoshimura, Narihiko; Tomizawa, Hirotaka; and Komatsu, Yasuji, 4,889,650, Cl. 252-79.000.
Komet Stahlhalter- und Werkzeugfabrik Robert Breuning GmbH: *See*—
Killinger, Bernd, 4,889,456, Cl. 408-224.000.
Komoriya, Akira: *See*—
Packard, Beverly; Edidin, Michael; and Komoriya, Akira, 4,889,916, Cl. 525-54.100.
Komuro, Hirokazu, to Canon Kabushiki Kaisha. Method of preparing a substrate for ink jet head and method of preparing an ink jet head. 4,889,587, Cl. 156-643.000.
Komuro, Takao: *See*—
Fukushima, Tsutomu; Nakao, Tsugio; Yamashita, Kasane; Komuro, Takao; and Nishi, Katsuhiro, 4,889,697, Cl. 423-140.000.
Kondo, Kenshi, to Nihon Den-Netsu Keiki Co., Ltd. Soldering apparatus. 4,889,273, Cl. 228-8.000.
Kondo, Shigeki, to Mitsubishi Denki Kabushiki Kaisha. Automatic transmission control device. 4,889,015, Cl. 74-866.000.
Kondo, Shinichi: *See*—
Machinami, Tomoya; Nakamura, Takeshi; Nishihata, Ken; Kondo, Shinichi; and Takeuchi, Tomio, 4,889,926, Cl. 536-6.400.
Kondo, Tetsujiro, to Sony Corporation. Decoding apparatus. 4,890,161, Cl. 358-135.000.
Konig, Johan W.: *See*—
Van Veen, Jacobus J. F.; Konig, Johan W.; Ter Kuile, Willem M.; and Van Dijk, Cornelis, 4,889,427, Cl. 356-445.000.
Konishi, Ryoji, to Teikoku Seiyaku Kabushiki Kaisha. Sustained release dosage form for use with tissues of the oral cavity. 4,889,720, Cl. 424-448.000.
Konishiroku Photo Industry Co., Ltd.: *See*—
Arai, Norikazu, 4,889,417, Cl. 350-432.000.
Koor Metals Ltd.: *See*—
Yerushalmi, Yaakov, 4,889,258, Cl. 220-429.000.
Kopel, David. Wallet incorporating credit card alarm system. 4,890,094, Cl. 340-571.000.
Kopin Corporation: *See*—
Fan, John C. C.; and Zavracky, Paul M., 4,889,565, Cl. 136-256.000.
Korber AG: *See*—
Chehab, Firdausia; and Koch, Franz P., 4,888,977, Cl. 73-38.000.
Deutsch, Reinhard, 4,889,226, Cl. 198-450.000.
Heitmann, Uwe; and Brand, Peter, 4,889,138, Cl. 131-84.100.
Heitmann, Uwe, 4,889,139, Cl. 131-84.300.
Lorenzen, Heinz C.; Pinck, Peter; and Lange, Norbert, 4,889,140, Cl. 131-281.000.
Korman, Charles S.: *See*—
Baliga, Bantval J.; and Korman, Charles S., 4,890,143, Cl. 357-23.400.
Kosaka, Takao; Miyauchi, Masahiro; Koike, Naomasa; and Higuchi, Masahiro, to Mitsubishi Paper Mills Limited. Thermosensitive recording materials. 4,889,841, Cl. 503-209.000.
Koshida, Yoshinori; Miyake, Isao; Okazaki, Yasuo; Motoi, Nobuhiro; and Nakaya, Mitsuru, to Oki Electric Industry Co., Ltd. Cash dispenser with manifold safe. 4,889,978, Cl. 235-379.000.
Koshino, Nagaaki: *See*—
Utsumi, Kenichi; Yuasa, Tetsuya; Goto, Yasuyuki; Tsugawa, Iwao; and Koshino, Nagaaki, 4,889,746, Cl. 427-162.000.
Kosmahl, Henry G., to United States of America, National Aeronautics and Space Administration. Miniature traveling wave tube and method of making. 4,890,036, Cl. 315-3.500.
Kosters, Peter H., to Dow Chemical Company, The. Heat exchanger. 4,889,182, Cl. 165-134.100.
Kostlin, Heiner: *See*—
Auding, Hans; Frank, Gunter; Kostlin, Heiner; and Vitt, Bruno, 4,889,974, Cl. 219-543.000.
Kosuge, Maki: *See*—
Kaifu, Katsuaki; Kosuge, Maki; Yamashita, Yoshio; Asano, takateru; and Kobayashi, Kenji, 4,889,795, Cl. 430-326.000.
Kotera, Noboru; Eguchi, Shusaku; and Miura, Norio, to Kasei Optonix, Ltd. Method for obtaining a radiation image. 4,889,996, Cl. 250-484.100.
Kotowicz, Aleksander: *See*—
Kinzler, Hans; and Kotowicz, Aleksander, 4,888,970, Cl. 70-456.00R.
Kotraro, Reuven: *See*—
Perry, Mordechai; Kotraro, Reuven; Linder, Charles; and Aviv, Gershon, 4,889,636, Cl. 210-651.000.
Kouiti, Yabuki: *See*—
Kei, Mori; Mitsuyuki, Kikyo; and Kouiti, Yabuki, 4,889,578, Cl. 156-294.000.
Kousaka, Tomomi: *See*—
Okada, Eiichi; Ozawa, Akira; Kousaka, Tomomi; and Ohba, Hirokazu, 4,888,865, Cl. 29-568.000.
Kouzai, Tetsuo: *See*—
Takehana, Tsutomu; Kouzai, Tetsuo; Sagara, Masaaki; Yaginuma, Tamio; and Sasaki, Teruji, 4,888,936, Cl. 53-510.000.
Kovacs, Linda A.: *See*—
Jabusch, John D.; Kovacs, Linda A.; Plzak, Timothy G.; and Richardson, Robert R., 4,890,253, Cl. 364-736.500.
Kovarik, David P.: *See*—
Brosnan, Denis A.; Whetsel, James E.; Singer, Richard E.; Samas, Mark V.; Amos, Michael D.; and Kovarik, David P., 4,889,324, Cl. 266-157.000.
Kover, Alexander: *See*—
Wu, Edwin S.; and Kover, Alexander, 4,889,941, Cl. 549-403.000.
Kowalski, Jacek: *See*—
Tailliet, Francois; and Kowalski, Jacek, 4,890,187, Cl. 361-111.000.
Kowatsch, Ulrich; and Bauer, Heike, to GEZE Sport International GmbH. Laterally releasable jaw unit of a safety ski binding. 4,889,359, Cl. 280-629.000.
Kozacky, Walter J.: *See*—
Russell, Gary; and Kozacky, Walter J., 4,890,188, Cl. 361-154.000.
Kozak, Robert J. Tank bottom sampling device. 4,888,999, Cl. 73-864.650.
Krasko, Zeya K.: *See*—
Keeffe, William M.; and Krasko, Zeya K., 4,890,030, Cl. 313-25.000.
Kreher, Neal B.: *See*—
Timmons, Michael B.; and Kreher, Neal B., 4,889,741, Cl. 426-614.000.
Kreimer, Charles C.: *See*—
Green, F. Richard; and Kreimer, Charles C., 4,888,918, Cl. 49-501.000.
Kremer, Bernard K.: *See*—
Royce, Ralph R.; Kremer, Bernard K.; and Bisio, Paul D., 4,889,643, Cl. 252-8.800.
Krenkel, Bernhard; and Joos, Heinz, to F. Oberdorfer GmbH & Co. KG Industriegewebe-Technik. Method for the manufacture of dimensionally stable, liquid-impermeable, flexible press bands. 4,889,674, Cl. 264-130.000.
Kresge, Charles T.: *See*—
Chin, Arthur A.; Johnson, Ivy D.; Kresge, Charles T.; and Sarli, Michael S., 4,889,615, Cl. 208-113.000.
Kresl, Hans: *See*—
Pusch, Hermann; Zeller, Siegfried; Millionis, Konstantin; and Kresl, Hans, 4,889,323, Cl. 266-142.000.
Kretschmer, Helmut: *See*—
Burst, Hermann; Durm, Jurgen; Kretschmer, Helmut; and Schuhmann, Georg, 4,889,382, Cl. 296-180.500.
Krieg, Aloisius; Huger, Alois; and Schnetter, Wolfgang, to Boehringer Mannheim GmbH. Protein tokin from bacillus thiringiensis which is toxic to coleoptera. 4,889,918, Cl. 530-350.000.
Kriegesmann, Jochen; Franek, Henning; and Bluethgen, Waldemar, to Ernst Leitz Wetzlar GmbH. Use of an oxide ceramic material for compression molds for shaping elements made from glass or a glass-containing ceramic and having high surface quality and dimensional accuracy. 4,889,548, Cl. 65-305.000.
Krimsky, Leonard C., to Worldwide Converting Machinery. Coating apparatus. 4,889,072, Cl. 118-244.000.

Krishnakumar, Suppayan M.: *See*—
Collette, Wayne N.; and Krishnakumar, Suppayan M., 4,889,247, Cl. 215-1.00C.
Kristen, Ulrich; and Wirth, Hermann O., to Ciba-Geigy Corporation. 1,4-Oxathianones and 1,4-oxathiepanones. 4,889,938, Cl. 549-10.000.
Krone Aktiengesellschaft: *See*—
Walker, Robert; Fitzgerald, Robert; and Bippus, Hans-Dieter, 4,889,405, Cl. 350-96.210.
Krueger, W. E. "Wes" , to E-Z Lift Pump, Inc. Production plunger. 4,889,473, Cl. 417-56.000.
Kruger, Hans-Rudolf: *See*—
Wegner, Peter; Kruger, Hans-Rudolf; Baumert, Dietrich; and Joppien, Hartmut, 4,889,870, Cl. 514-429.000.
Kruger, Martin: *See*—
Rowson, Graham P.; Head, John C.; Westermann, Jurgen; Kruger, Martin; Arndt, Friedrich; and Rees, Richard, 4,889,553, Cl. 71-92.000.
Kruger, Volker; and Daenicke, Heinrich. Drill bit direct drive for deep well drilling tools. 4,889,195, Cl. 175-107.000.
Krupp Polysius AG: *See*—
Lohnherr, Ludger; and Holz, Walter, 4,889,289, Cl. 241-18.000.
Krusos, Denis A.: *See*—
DiSanto, Frank J.; Krusos, Denis A.; and Schubert, Frederic E., 4,889,603, Cl. 204-180.100.
Krygier, S. James; and DeMayo, Alexander. Dental throat shield. 4,889,491, Cl. 433-136.000.
Kuboki, Shigeo: *See*—
Masuda, Ikuro; Kato, Kazuo; Sasayama, Takao; Nishio, Yoji; Kuboki, Shigeo; and Iwamura, Masahiro, 4,890,017, Cl. 307-446.000.
Kubota, Takahiro: *See*—
Adaniya, Takeshi; Yamashita, Masaaki; Kubota, Takahiro; Enatsu, Akira; Nikaido, Norio; Miyosawa, Yoshiaki; and Nishimoto, Tadashi, 4,889,775, Cl. 428-62.00B.
Kugler, Wolfgang: *See*—
Beyer, Hans-Ernst; Bonitz, Jorg; Entenmann, Robert; Forster, Siegmar; Knab, Rochus; Kunzel, Walter; Kugler, Wolfgang; Mahlberg, Alfred; Miller, Bernhard; Philipp, Matthias; Rohde, Siegfried; Unland, Stefan; Viess, Walter; Winter, Herbert; and Zimmermann, Jurgen, 4,889,094, Cl. 123-414.000.
Kuhn, Wolf, to Maschinebau Oppenweiler Binder GmbH & Co. Electromechanical abutment sensor with resilient damper plate for sensing sheets in a sheet folding machine. 4,890,060, Cl. 324-239.000.
Kuipers, Johannes: *See*—
Dolman, Hendrik; and Kuipers, Johannes, 4,889,863, Cl. 514-312.000.
Kumabe, Hisao, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor laser device. 4,890,292, Cl. 372-415.000.
Kumano, Fumihiro: *See*—
Fujikawa, Shouji; Araki, Masakatsu; Kumano, Fumihiro; and Tsujimura, Shinichirou, 4,888,870, Cl. 30-233.500.
Kumiai Chemical Industry Co., Ltd.: *See*—
Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; and Takahashi, Satoru, 4,889,552, Cl. 71-92.000.
Kumon, Toshihiko; and Nishioka, Nobuaki, to Minolta Camera Kabushiki Kaisha. Electric apparatus having a start-up control function. 4,890,212, Cl. 363-49.000.
Kuno, Hiroaki: *See*—
Izunaga, Yasushi; Kuno, Hiroaki; and Sado, Shintaro, 4,889,471, Cl. 417-32.000.
Kunreuther, Steven J. Automatic apparatus for attaching tags to labels previously affixed to garments. 4,889,272, Cl. 227-4.000.
Kunz, Anton, to Balzers Aktiengesellschaft. Device for transmission of electrical currents and rotating machine parts. 4,889,494, Cl. 439-13.000.
Kunzel, Walter: *See*—
Beyer, Hans-Ernst; Bonitz, Jorg; Entenmann, Robert; Forster, Siegmar; Knab, Rochus; Kunzel, Walter; Kugler, Wolfgang; Mahlberg, Alfred; Miller, Bernhard; Philipp, Matthias; Rohde, Siegfried; Unland, Stefan; Viess, Walter; Winter, Herbert; and Zimmermann, Jurgen, 4,889,094, Cl. 123-414.000.
Kuo, Li-Tsao. Bicycle lock. 4,888,967, Cl. 70-52.000.
Kurakake, Mitsuo; and Sakamoto, Keiji, to Fanuc Ltd. Numerical control apparatus. 4,890,046, Cl. 318-630.000.
Kurakake, Mitsuo; Otsuka, Shoichi; and Muraoka, Yutaka, to Fanuc Ltd. Picture processing apparatus including a dual port memory. 4,890,100, Cl. 340-799.000.
Kuraray Co., Ltd.: *See*—
Nakamura, Seishiro; Oukami, Katutoshi; and Asada, Masayuki, 4,889,833, Cl. 501-1.000.
Kurashiki Kako Co., Ltd.: *See*—
Kei, Mori; Mitsuyuki, Kikyo; and Kouiti, Yabuki, 4,889,578, Cl. 156-294.000.
Kurauchi, Toshio: *See*—
Usuki, Arimitsu; Mizutani, Tadashi; Fukushima, Yoshiaki; Fujimoto, Megumi; Fukumori, Kenzo; Kojima, Yoshitsugu; Sato, Norio; Kurauchi, Toshio; and Kamigaito, Osami, 4,889,885, Cl. 524-445.000.
Kurihara, Kenichi: *See*—
Kameda, Masahiro; Kamei, Yojiro; and Kurihara, Kenichi, 4,890,151, Cl. 357-65.000.
Kuroda Seiko Company Limited: *See*—
Hozumi, Kazuhiro; Arai, Masaru; and Saito, Yoshitane, 4,889,164, Cl. 137-625.640.
Kuroda, Tsuyoshi: *See*—
Araki, Kazuhiko; Kuroda, Tsuyoshi; Uemori, Satoru; Moriguchi, Akihiko; and Ikeda, Yoshifumi, 4,889,857, Cl. 514-235.200.
Kurokawa, Mikio: *See*—
Uno, Hitoshi; Kurokawa, Mikio; Sato, Fuminori; Naruto, Shunsuke; and Masuda, Yoshinobu, 4,889,858, Cl. 514-254.000.
Kurokawa, Toshio, to Fuji Photo Film Co., Ltd. Feed roller. 4,889,271, Cl. 226-186.000.
Kurono, Masayasu: *See*—
Sawai, Kiichi; Kurono, Masayasu; Awaya, Juichi; Kojima, Akio; and Ninomiya, Hideaki, 4,889,715, Cl. 424-80.000.
Kurosawa, Makoto: *See*—
Matsumoto, Yoshikane; Hiki, Toshio; and Kurosawa, Makoto, 4,889,052, Cl. 101-93.040.
Kurosawa, Toshiharu: *See*—
Nakazato, Katsuo; Tsuchiya, Hiroyoshi; Kurosawa, Toshiharu; Maruyama, Yuji; and Takahashi, Kiyoshi, 4,890,167, Cl. 358-443.000.
Kurozu, Tomotaka; and Kataoka, Sachiro, to Nissan Motor Co., Ltd. Power supply circuit for automotive headlamp with combinational switch. 4,890,038, Cl. 315-82.000.
Kusano, Akihisa: *See*—
Inuyama, Toshihiko; Kimizuka, Junichi; Kusano, Akihisa; Sato, Kaoru; and Soya, Takashi, 4,890,288, Cl. 372-31.000.
Kusano, Shoji: *See*—
Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; and Takahashi, Satoru, 4,889,552, Cl. 71-92.000.
Kusefoglu, Selim H.: *See*—
Mathias, Lon J.; and Kusefoglu, Selim H., 4,889,948, Cl. 560-181.000.
Kuwabara, Hideki: *See*—
Akiyama, Hiroyuki; Izawa, Susumu; Kuwabara, Hideki; and Yamaguchi, Toru, 4,889,671, Cl. 264-53.000.
Kuwahara, Yoshihiko, to NEC Corporation. Microwave landing system. 4,890,110, Cl. 342-35.000.
Kuwayama, Yoshinari; Yokoyama, Fumitomo; and Miura, Masakatsu, to Aisin-Warner Kabushiki Kaisha. Hydraulic servo regulating systems in an automatic transmission. 4,889,016, Cl. 74-868.000.
Kuzyk, Roman; and Edwards, Lewis M., to Kuzyk, Roman. Automatic film processors. 4,890,131, Cl. 354-299.000.
La Telemecanique Electrique: *See*—
Barbier, Rene ; and Guenin, Serge, 4,889,504, Cl. 439-712.000.
Label Printers, The: *See*—
Chouinard, Gerald A., 4,889,365, Cl. 283-70.000.
Lackhove, Josef: *See*—
Karl, Heinz-Dietmar; Tinebor, Manfred; and Lackhove, Josef, 4,890,185, Cl. 361-91.000.
Lacrex Brevetti S.A.: *See*—
Pasbrig, Max, 4,889,320, Cl. 254-252.000.
Ladkani, David: *See*—
Vaya, Jacob; Ladkani, David; Schoenberger, Clara; Kaspi, Joseph; Salemnick, Gad; Yellin, Haim; and Cherkez, Stephan, 4,889,929, Cl. 540-318.000.
Lagsdin, Andry. Stabilizer pad for earthmoving apparatus. 4,889,362, Cl. 280-763.100.
Laidlaw, Curtis L.; and Brewer, Bradley J. Thread cleaning nut. 4,889,460, Cl. 411-437.000.
Laipply, Robert A., to Aeroquip Corporation. Combination quick-connect and thread-disconnect tube connector. 4,889,368, Cl. 285-18.000.
l'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See*—
Pelloux-Gervais, Pierre; Zapata, Richard; and Bres, Michel, 4,889,113, Cl. 128-201.250.
Lakatos, Daniel, to Hydro International Limited. Vortex valves. 4,889,166, Cl. 137-813.000.
Lake, David A.: *See*—
Schmulian, Marius; and Lake, David A., 4,889,253, Cl. 220-22.100.
Laletin, William H., to Howe Technologies Corporation. Relative time delay correction system utilizing window of zero correction. 4,890,065, Cl. 328-155.000.
Lam, Veronica Y.; and Lam, Wing-Chee, to Johns Hopkins University. Bi-directional x-ray imager. 4,890,313, Cl. 378-189.000.
Lam, Wing-Chee: *See*—
Lam, Veronica Y.; and Lam, Wing-Chee, 4,890,313, Cl. 378-189.000.
Lamb, James S., to Tektronix, Inc. Common base configuration for an f_T doubler amplifier. 4,890,067, Cl. 330-149.000.
Lambert, Maureen K.; and Chrisman, Roger P., to Network Equipment Technologies, Inc. Mixed mode compression for data transmission. 4,890,282, Cl. 370-79.000.
Laminar Fluid Controls, Inc.: *See*—
Feild, Eugene P., 4,889,159, Cl. 137-508.000.
Lanati, Paolo: *See*—
Scapecchi, Pier L.; Coghi, Giovanni; and Lanati, Paolo, 4,889,086, Cl. 123-90.150.
Lancelot, Harry B., to Richmond Screw Anchor Co., Inc. Setting hoist anchors in poured concrete structures. 4,888,922, Cl. 52-124.200.
Lancer Corporation: *See*—
McMichael, Dannie L., 4,888,961, Cl. 62-398.000.
Landis, Michael E.: *See*—
Chu, Pochen; Green, Larry A.; and Landis, Michael E., 4,889,839, Cl. 502-242.000.
Laney, Mark C.: *See*—
French, Kendrick L.; and Laney, Mark C., 4,888,901, Cl. 42-51.000.

Lang, Gerard: *See*—
Shroot, Braham; Lang, Gerard; Maignan, Jean; Restle , Serge; Hensby, Christopher; and Colin, Michel, 4,889,865, Cl. 514-332.000.
Lange, Arno; Wuerzer, Bruno; and Meyer, Norbert, to BASF Aktiengesellschaft. Diphenyl ether derivatives, their preparation and their use for controlling undesirable plant growth. 4,889,554, Cl. 71-118.000.
Lange, Norbert: *See*—
Lorenzen, Heinz C.; Pinck, Peter; and Lange, Norbert, 4,889,140, Cl. 131-281.000.
Languillat, Jean-Paul, to Lhomme S.A. Tube truncation apparatus and method. 4,889,023, Cl. 82-92.000.
Lara, Jean, to Igenov. Refrigeration unit for produce and, in particular, for fresh vegetables. 4,888,960, Cl. 62-298.000.
LaRoy, Bernard C.: *See*—
Banyasz, Joseph L.; Burton, Aubrey T.; LaRoy, Bernard C.; and Lowitz, David A., 4,890,053, Cl. 324-58.50A.
Latif, Sherif; and Ryan, Robert F., to BOC Group, Inc., The. Fumigant system. 4,889,708, Cl. 424-43.000.
Lau, Shek-Hong H.: *See*—
Gaffar, Abdul; Lau, Shek-Hong H.; Afflito, John; and Nykvist, Arline M., 4,889,712, Cl. 424-52.000.
Laurenzo, Kathleen S.; and Bauer, Dennis P., to Ethyl Corporation. Amine oxide process. 4,889,954, Cl. 564-298.000.
Lawrence, Robert: *See*—
Leyden, Richard N.; Lawrence, Robert; and Elias, William E., 4,889,585, Cl. 156-630.000.
Lawter, James R.: *See*—
Ritter, Lawrence; and Lawter, James R., 4,889,845, Cl. 514-63.000.
Lawyer, Frances C.: *See*—
Gelfand, David H.; Stoffel, Susanne; Lawyer, Frances C.; and Saiki, Randall K., 4,889,818, Cl. 435-194.000.
Lazar, Michael; and Noschese, Rocco, to Burndy Corporation. Controlled impedance connector assembly. 4,889,500, Cl. 439-579.000.
Lazar, Steven C., Jr.: *See*—
Duffalo, Joseph M.; and Lazar, Steven C., Jr., 4,890,069, Cl. 330-277.000.
Le, Hu P.: *See*—
Jaeger, Charles W.; Titterington, Donald R.; Le, Hu P.; and Sopko, Jeffrey J., 4,889,560, Cl. 106-27.000.
Leatherman, Timothy S., to Leatherman Tool Group, Inc. Lock-bar foldable tool. 4,888,869, Cl. 30-161.000.
Leatherman Tool Group, Inc.: *See*—
Leatherman, Timothy S., 4,888,869, Cl. 30-161.000.
Lecourt, Jean; Legros, Desire; and Granville, Andre, to Saint-Gobain Vitrage "Les Miroirs" . Apparatus for thermal bending of glass sheets. 4,889,547, Cl. 65-107.000.
Lectro Stik Corp.: *See*—
Shano, Charles L., 4,889,440, Cl. 401-1.000.
Lee, Arnold St. J. Method for determining heart rate. 4,889,123, Cl. 128-644.000.
Lee, Arnold St. J. Method for monitoring a subject's heart and lung sounds. 4,889,130, Cl. 128-670.000.
Lee, Chi-Ho: *See*—
Pfister, Jurg R.; Davis, Roman; and Lee, Chi-Ho, 4,889,866, Cl. 514-347.000.
Lee, Ki W.; and Choi, Il-Hyun, to Siemens-Bendix Automotive Electronics L.P. Silicon based mass airflow sensor and its fabrication method. 4,888,988, Cl. 73-204.260.
Lee, Kil J. Rotating clothes tree. 4,889,246, Cl. 211-163.000.
Lee, Lindsey D., to Halliburton Company. Slipliner grouting method and system. 4,889,449, Cl. 405-154.000.
Lee, Paul B. Downhole valve for use when drilling an oil or gas well. 4,889,199, Cl. 175-317.000.
Lee, Roger H. Shirt and tie garment protector. 4,888,827, Cl. 2-52.000.
Lee, Shu-Hwa. Christmas light set compiler. 4,890,206, Cl. 362-227.000.
Lee, Suh Y.: *See*—
Whitlow, Graham A.; and Lee, Suh Y., 4,889,059, Cl. 110-246.000.
Yang, Wen-Ching; Lee, Suh Y.; and Ettehadieh, Bozorg, 4,889,058, Cl. 110-214.000.
Leggett & Platt, Incorporated: *See*—
Sulzer, James H., 4,889,384, Cl. 297-302.000.
Legille, Edouard; and Lonardi, Emile, to Paul Wurth S.A. Apparatus for driving an oscillating spout. 4,889,008, Cl. 74-520.000.
Legrand: *See*—
Sarton, Francois; and Roby, Gerard, 4,889,299, Cl. 248-72.000.
Legros, Desire: *See*—
Lecourt, Jean; Legros, Desire; and Granville, Andre, 4,889,547, Cl. 65-107.000.
Le Grow, Gary E.: *See*—
Bujalski, Duane R.; Le Grow, Gary E.; Lipowitz, Jonathan; and Lim, Thomas F., 4,889,899, Cl. 525-479.000.
Lehigh University: *See*—
Izenour, George C., 4,890,208, Cl. 362-294.000.
Lehmann, Jean-Philippe; and Isoardi, Patrick. Data processing device for simultaneously activating and applying paraller trains of commands to memories for storing matrices. 4,890,255, Cl. 364-900.000.
Lehtonen, Reijo: *See*—
Hakala, Timo; and Lehtonen, Reijo, 4,888,825, Cl. 2-8.000.
Leland Stanford, Jr. University, Board of Trustees of: *See*—
Basu, Santanu; and Byer, Robert L., 4,890,289, Cl. 372-33.000.
Lenze GmbH & Co. KG Aerzen: *See*—
Karl, Heinz-Dietmar; Tinebor, Manfred; and Lackhove, Josef, 4,890,185, Cl. 361-91.000.
Leonard, Antony J.; and Macleod, Donald A., to Unisys Corporation. Document feeding apparatus. 4,889,332, Cl. 271-108.000.
Leong, Dennis Y., to ETI Explosives Technologies International (Canada), Ltd. Blasting explosive with improved water resistance. 4,889,570, Cl. 149-7.000.
Lerch, Thomas J.: *See*—
Smith, Ronald J.; Lerch, Thomas J.; and McLeod, Rick, 4,888,843, Cl. 15-98.000.
le Roux Murray, Pieter W. Cryogenic apparatus and cryogenic methods. 4,888,956, Cl. 62-51.100.
Leslie, Samuel A.: *See*—
Hendixen, Arne B.; Bowen, William A.; Evans, Michael W.; Hurley, John J.; and Leslie, Samuel A., 4,890,315, Cl. 379-59.000.
Leu, James M. Fireplace tool. 4,889,375, Cl. 294-10.000.
Leung, Howard K. H.: *See*—
Barden, John M.; and Leung, Howard K. H., 4,889,492, Cl. 437-15.000.
Lever Brothers Company: *See*—
Doornbos, Tamme S. M.; Haring, Petrus; and Van Der Heijden, Arnoldus, 4,889,736, Cl. 426-536.000.
Levin, Steven. Hybrid estimating filter. 4,890,250, Cl. 364-602.000.
Levine, Mark: *See*—
McNeal, Jack D.; Levine, Mark; and Beery, J. Harvey, 4,889,613, Cl. 204-416.000.
Lew, Hyok S. Relative motion sensor. 4,888,991, Cl. 73-658.000.
Lewis, John R., Jr., to Shakespeare Company. Low profile, broad band monopole antenna. 4,890,116, Cl. 343-749.000.
Lewis, Kenrick M.; and Chang, Ching-Feng, to Union Carbide Corporation and Plastics Company Inc. Redistribution of organohalosilanes utilizing heat treated crystalline alumina catalysts. 4,889,838, Cl. 502-27.000.
Lewis, Martyn A.: *See*—
Hinds, Walter E.; and Lewis, Martyn A., 4,890,023, Cl. 310-12.000.
Lewis, Roger C. Adjustable snelled fish hook assembly. 4,888,910, Cl. 43-44.820.
Leyden, Richard N.; Lawrence, Robert; and Elias, William E., to Hughes Aircraft Company. Method for selectively forming small diameter holes in polyimide/Kevlar substrates. 4,889,585, Cl. 156-630.000.
Lhomme S.A.: *See*—
Languillat, Jean-Paul, 4,889,023, Cl. 82-92.000.
Liang, Yeon F., to Plastics Engineering Company. Thermoplastic polyester blends of improved impact resistance. 4,889,898, Cl. 525-67.000.
Licentia Patent-Verwaltungs-GmbH: *See*—
Hadeler, Dieter; and Appeldorn, Alfred, 4,890,025, Cl. 310-68.00C.
Lichty, Maynard E.: *See*—
Shepherd, Robin G.; Chai, Sie-Yearl; Lichty, Maynard E.; and Milowsky, Arnold S., 4,889,936, Cl. 548-149.000.
Liechti, Pierre, to List AG. Mixing kneader with kneading forks. 4,889,431, Cl. 366-99.000.
Liedloff, Manfred: *See*—
Maack, Werner; Gerst, Michael; and Liedloff, Manfred, 4,888,867, Cl. 29-857.000.
Liedy, Werner: *See*—
Schuster, Ludwig; Hettche, Albert; Liedy, Werner; Weiss, Stefan; and Ehemann, Leo, 4,889,897, Cl. 525-388.000.
Lienenluke, Paul: *See*—
Helmes, Ludger; and Lienenluke, Paul, 4,888,850, Cl. 15-359.000.
Life Technologies, Inc.: *See*—
Flesher, Robert W.; Berninger, Mark S.; and Blakesley, Robert W., 4,889,610, Cl. 204-299.00R.
Lim, Samson: *See*—
Seth-Smith, Nigel; Bates, Cameron; Lim, Samson; Rassel, William van; Yoneda, Robert; and Lucas, Keith, 4,890,319, Cl. 380-5.000.
Seth-Smith, Nigel; Bates, Cameron; Lim, Samson; van Rassel, William; Yoneda, Robert; and Lucas, Keith, 4,890,321, Cl. 380-20.000.
Lim, Thomas F.: *See*—
Bujalski, Duane R.; Le Grow, Gary E.; Lipowitz, Jonathan; and Lim, Thomas F., 4,889,899, Cl. 525-479.000.
Lin, Fu-Shiong: *See*—
Graham, Wesley H.; Axter, Sven E.; and Lin, Fu-Shiong, 4,889,569, Cl. 148-130.000.
Lin, Shyh-Ling; and Lin, Yeong-Sung. Ball point pen with self-provided illuminator. 4,890,204, Cl. 362-118.000.
Lin, Yeong-Sung: *See*—
Lin, Shyh-Ling; and Lin, Yeong-Sung, 4,890,204, Cl. 362-118.000.
Lindenmeier, Heinz: *See*—
Flachenecker, Gerhard; Fastenmeier, Karl; and Lindenmeier, Heinz, 4,890,073, Cl. 331-55.000.
Linder, Charles: *See*—
Perry, Mordechai; Kotraro, Reuven; Linder, Charles; and Aviv, Gershon, 4,889,636, Cl. 210-651.000.
Lindsey, William J. Shower toletries kit. 4,889,141, Cl. 132-286.000.
Lipowitz, Jonathan: *See*—
Bujalski, Duane R.; Le Grow, Gary E.; Lipowitz, Jonathan; and Lim, Thomas F., 4,889,899, Cl. 525-479.000.
Liquid Carbonic Corporation: *See*—
Tyree, Lewis, Jr.; Gyger, Roger F.; and Rhoades, George D., 4,888,955, Cl. 62-47.100.
Lisnyansky, Khaim; and Blecha, William E., to International Paper Company. Apparatus for continuously measuring the soda loss in a pulp washing system. 4,889,599, Cl. 162-263.000.
List AG: *See*—
Liechti, Pierre, 4,889,431, Cl. 366-99.000.

List, Harold A., to Railway Engineering Associates, Inc. Steering arms for self-steering trucks and truck retrofitting method. 4,889,054, Cl. 105-167.000.

Little, Wendell L., to Dallas Semiconductor Corporation. RAM with capability for rapid clearing of data from memory by simultaneously selecting all row lines. 4,890,263, Cl. 365-218.000.

Lloyd, Hershall E.; and Lloyd, Monte E., to Safe-T-Quake Corporation. Pressure control for earthquake sensitive shut-off valve. 4,889,150, Cl. 137-39.000.

Lloyd, Monte E.: *See—*
Lloyd, Hershall E.; and Lloyd, Monte E., 4,889,150, Cl. 137-39.000.

Locko, George A., to Union Camp Corporation. Device for dispensing volatile fragrances. 4,889,285, Cl. 239-34.000.

Lockwood Technical, Inc.: *See—*
Russell, Gary; and Kozacky, Walter J., 4,890,188, Cl. 361-154.000.

Loeb, David J.; and Milliken, Keith R., to International Business Machines Corporation. Coalescing changes in pattern-directed, rule-based artificial intelligence production systems. 4,890,240, Cl. 364-513.000.

Loeck, Steven M.: *See—*
Pea, Kevin I.; Tenniswood, David M.; and Loeck, Steven M., 4,889,964, Cl. 200-31.00R.

Loewe, Erhard; and Bertels, Ludger, to Du Pont de Nemours, E. I., and Company. Lightproof cassette. 4,889,292, Cl. 242-71.100.

Lohnherr, Ludger; and Holz, Walter, to Krupp Polysius AG. Method and apparatus for crushing material for grinding. 4,889,289, Cl. 241-18.000.

Lojewski, James R.: *See—*
Ulrich, Lawrence W.; and Lojewski, James R., 4,889,581, Cl. 156-443.000.

Lok, Kar P.: *See—*
Dunfield, Lawrence G.; and Lok, Kar P., 4,888,983, Cl. 73-104.000.

Lombardi, Donald G. Adjustable cymbal holder. 4,889,028, Cl. 84-421.000.

Lonardi, Emile: *See—*
Legille, Edouard; and Lonardi, Emile, 4,889,008, Cl. 74-520.000.
Mailliet, Pierre; Lonardi, Emile; and Cimenti, Giovanni, 4,889,004, Cl. 74-479.000.

Long, Michael; Palone, Thomas W.; and Kemp, Paul, to Eastman Kodak Company. Web center-guiding apparatus. 4,889,269, Cl. 226-97.000.

Longfield, Ross N., to Beneficial Management Corporation of America. Electronic income tax refund early payment system. 4,890,228, Cl. 364-408.000.

Lord Corporation: *See—*
Flower, Wallace C.; and Thorn, Richard P., 4,889,325, Cl. 267-140.100.

L'Oreal: *See—*
Gueret, Jean-Louis, 4,889,228, Cl. 206-209.000.

L'Oreal, S. A.: *See—*
Toms, Ray A., 4,889,262, Cl. 222-153.000.

Loredan Biomedical, Inc.: *See—*
Bond, Malcolm L.; and Dempster, Phlip T., 4,889,108, Cl. 128-25.00R.

Lorenzen, Heinz C.; Pinck, Peter; and Lange, Norbert, to Korber AG. Apparatus for making perforations in articles of the tobacco processing industry. 4,889,140, Cl. 131-281.000.

Lorik, Erno : *See—*
Balogh, Karoly; Dombay, Zsolt; Fodor, Karoly; Grega nee Toth, Erzebet; Lorik, Erno ; Magyar nee Tomorkenyi, Magdolna; Nagy, Jozsef; Pasztor, Karoly; Santha, Pal; Tarpai, Gyula; Toth, Istvan; and Urszin nee Simon, Eszter, 4,889,944, Cl. 558-171.000.

Lotze, Marion; and Kleinschmit, Peter, to Degussa Aktiengesellschaft. Method of producing matte precious metal decorations. 4,889,769, Cl. 428-432.000.

Lovaas, Leeland M. Endodontic files. 4,889,487, Cl. 433-102.000.

Lovberg, Ralph H.: *See—*
Asmus, John F.; and Lovberg, Ralph H., 4,889,605, Cl. 204-157.440.

Lowitz, David A.: *See—*
Banyasz, Joseph L.; Burton, Aubrey T.; LaRoy, Bernard C.; and Lowitz, David A., 4,890,053, Cl. 324-58.50A.

Lowrance, Dan E.; Douglas, Donald L.; and Merryfield, David W., to Special Projects Manufacturing Inc. Apparatus for injecting balls into a well. 4,889,259, Cl. 221-75.000.

LSI Logic Corporation: *See—*
Sahakian, Vahak K., 4,890,154, Cl. 357-74.000.

Lubarsky, Daniel P., to Pacific Bell. Multiplexer and computer network using the same. 4,890,279, Cl. 370-58.100.

Lubbers, Dietrich W.: *See—*
Opitz, Norbert; and Lubbers, Dietrich W., 4,889,690, Cl. 422-73.000.

Luberne, Patricia: *See—*
Seinera, Henry; Luberne, Patricia; Stock, Claude; and Trouve, Patrick, 4,889,879, Cl. 524-13.000.

Lubrizol Corporation, The: *See—*
Miller, H. Richard, 4,889,880, Cl. 524-71.000.

Lucas Industries Public Ltd. Company: *See—*
Gaskell, David J., 4,889,288, Cl. 239-533.500.

Lucas, Keith: *See—*
Seth-Smith, Nigel; Bates, Cameron; Lim, Samson; Rassel, William van; Yoneda, Robert; and Lucas, Keith, 4,890,319, Cl. 380-5.000.
Seth-Smith, Nigel; Bates, Cameron; Lim, Samson; van Rassel, William; Yoneda, Robert; and Lucas, Keith, 4,890,321, Cl. 380-20.000.

Lucassen, Guenter: *See—*
Pinto, Akiva; Lucassen, Guenter; and Schmidt, Reinhard, 4,888,857, Cl. 19-80.00R.

Lugtmeier, Lubbertus; and Klamer, Albert, to Shell Internationale Research. Polished rod stuffing box with safety valve for a beam pumped production well. 4,889,184, Cl. 166-80.000.

LUK Lamellen und Kupplungsbau GmbH: *See—*
Friedmann, Oswald; and Elison, Hans-Dieter, 4,889,009, Cl. 74-574.000.

Lundquist, Alan E.: *See—*
Zscheile, John W., Jr.; Lundquist, Alan E.; and Spencer, Billie M., 4,890,297, Cl. 375-1.000.

Lurssen, Klaus: *See—*
Forster, Heinz; Eue, Ludwig; Schmidt, Robert R.; and Lurssen, Klaus, 4,889,946, Cl. 560-21.000.

Lutomski, Kathryn A.; Roush, David M.; and Phillips, Richard B., to FMC Corporation. Photoactivated miticidal and insecticidal ethynylthiazoles. 4,889,867, Cl. 514-365.000.

Lutron Electronics Co., Inc.: *See—*
Rowen, Michael J., 4,889,999, Cl. 307-31.000.

Lutz, Peter J., III, to E&E Engineering, Inc. Floor Squeak Eliminator. 4,888,926, Cl. 52-291.000.

Lutz, Richard W.: *See—*
Hutcheson, J. Stanford; Lutz, Richard W.; Obrist, Paul A.; Flaugher, David J.; and Watts, Charles E., 4,889,132, Cl. 128-680.000.

Lynch, Bobby R. Package with a crumb trap. 4,889,619, Cl. 209-374.000.

Lynn, Arthur E., Jr. Transfer case chain adjustment. 4,889,436, Cl. 384-447.000.

M. G. H. Automation Systems: *See—*
Cohen, William, 4,889,076, Cl. 119-50.000.

M & S Engineering & Manufacturing Co., Inc.: *See—*
Przewalski, Zygmunt J., 4,889,484, Cl. 432-103.000.

Maack, Werner; Gerst, Michael; and Liedloff, Manfred, to AMP Incorporated. Method of manufacturing electrical harnesses. 4,888,867, Cl. 29-857.000.

Maaz, Gunther: *See—*
Oldendorf, Christian; Maaz, Gunther; Nottbohm, Klaus; and Handwerk, Volker, 4,889,201, Cl. 177-25.140.

Mabbitt, Allen W.: *See—*
Allsop, Bryan E.; Mabbitt, Allen W.; and Smith, Kevin K., 4,889,985, Cl. 250-214.00A.

MacArthur, J. Ward: *See—*
Grald, Eric W.; and MacArthur, J. Ward, 4,889,280, Cl. 236-44.00C.

Machinami, Tomoya; Nakamura, Takeshi; Nishihata, Ken; Kondo, Shinichi; and Takeuchi, Tomio, to Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai. Method for the synthesis of (2″R)-4′-O-tetrahydropyranyladriamycim using 14-chloro-daunomycin as an intermediate. 4,889,926, Cl. 536-6.400.

Mackenzie, Colin A.: *See—*
Chalmers, Brian D.; Mackenzie, Colin A.; and Kapoor, Kishore K., 4,890,174, Cl. 360-78.120.

Mackevich, Daniel A., to Vanguard Products Corporation. Automotive alternator. 4,890,050, Cl. 322-34.000.

Mackles, Leonard; and Chavkin, Leonard, to Product Resources International, Inc. Aerosol foam with adsorbate and container containing same. 4,889,709, Cl. 424-45.000.

Mackrell, Andrew D.: *See—*
Brown, Alfred R.; and Mackrell, Andrew D., 4,889,994, Cl. 250-374.000.

Macleod, Donald A.: *See—*
Leonard, Antony J.; and Macleod, Donald A., 4,889,332, Cl. 271-108.000.

Mae, Shigenori: *See—*
Iwata, Yasuo; Mae, Shigenori; Urai, Yoshio; and Tsunoda, Takayuki, 4,889,557, Cl. 75-249.000.

Mae, Yoshiharu; Oka, Tsutomu; and Hirano, Atsushi, to Mitsubishi Kinzoku Kabushiki Kaisha. High strength Ti alloy material having improved workability and process for producing the same. 4,889,170, Cl. 148-407.000.

Maeda, Masao; Fukuse, Michiyo; Miyaaki, Tohru; and Miyake, Toshio, to Kanebo, Ltd.; and Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo. Chewing gum and a method of manufacturing the same. 4,889,728, Cl. 426-5.000.

Maeda, Yoshiyasu; Inoue, Yasuhiro; Uno, Toshiyuki; and Suzuki, Kazuyoshi, to Murata Kikai Kabushiki Kaisha. Method for quality control of textured yarn. 4,888,945, Cl. 57-264.000.

Maeder, Phillip M.: *See—*
McKamey, Porter L.; and Maeder, Phillip M., 4,888,842, Cl. 15-1.700.

Maeno, Yorihiko; and Higashi, Shigeyasu, to Dipole Electronics Co., Ltd. Apparatus and method for measuring physical quantities. 4,890,054, Cl. 324-58.50A.

Maggs, Norman B. Toothbrush for natural teeth and dentures. 4,888,844, Cl. 15-106.000.

Magna International (Canada) Inc.: *See—*
Hansen, Kent G., 4,888,866, Cl. 29-598.000.

Magnetic Peripherals Inc.: *See—*
Johnson, Bruce E.; and Tsang, Paul, 4,890,287, Cl. 371-37.200.

Magtech Laboratories, Inc.: *See—*
Rauscher, Elizabeth A.; and Van Blue, William L., 4,889,526, Cl. 600-14.000.

Magyar nee Tomorkenyi, Magdolna: *See*—
Balogh, Karoly; Dombay, Zsolt; Fodor, Karoly; Grega nee Toth, Erzebet; Lorik, Erno ; Magyar nee Tomorkenyi, Magdolna; Nagy, Jozsef; Pasztor, Karoly; Santha, Pal; Tarpai, Gyula; Toth, Istvan; and Urszin nee Simon, Eszter, 4,889,944, Cl. 558-171.000.

Mahan, Larry G. Universal bracket. 4,889,305, Cl. 248-265.000.

Mahlberg, Alfred: *See*—
Beyer, Hans-Ernst; Bonitz, Jorg; Entenmann, Robert; Forster, Siegmar; Knab, Rochus; Kunzel, Walter; Kugler, Wolfgang; Mahlberg, Alfred; Miller, Bernhard; Philipp, Matthias; Rohde, Siegfried; Unland, Stefan; Viess, Walter; Winter, Herbert; and Zimmermann, Jurgen, 4,889,094, Cl. 123-414.000.

Mahlich, Gotthard C.; and Borgmann, Michael, to Robert Krups Stiftung & Co. KG. Electric appliance for making hot beverages. 4,889,041, Cl. 99-285.000.

Maier, Reinhard: *See*—
Trenkler, Gerhard; Wedekind, Reinhard; and Maier, Reinhard, 4,890,058, Cl. 324-158.0MG.

Maier, Thomas: *See*—
Ehrhardt, Heinz; Mildenberger, Hilmar; Maier, Thomas; Schaller, Rainer; Sachse, Burkhard; and Braun, Peter, 4,889,864, Cl. 514-326.000.

Maignan, Jean: *See*—
Shroot, Braham; Lang, Gerard; Maignan, Jean; Restle , Serge; Hensby, Christopher; and Colin, Michel, 4,889,865, Cl. 514-332.000.

Mailliet, Pierre; Lonardi, Emile; and Cimenti, Giovanni, to Paul Wurth S.A. Apparatus for driving an oscillating spout. 4,889,004, Cl. 74-479.000.

Maitland, Arthur: *See*—
Clark, Graeme L.; and Maitland, Arthur, 4,890,295, Cl. 372-61.000.

Major, Barbara: *See*—
Major, William J., 4,889,032, Cl. 89-129.010.

Major, William J., to Major, Barbara. Automatic firearm. 4,889,032, Cl. 89-129.010.

Makihara, Novuo: *See*—
Tahara, Hideo; Makihara, Novuo; and Ono, Hiroshi, 4,889,507, Cl. 440-61.000.

Malfroid, Pierre; Nguyen, Qui Long; Blondin, Jean-Marie; and Burnay, Jean-Paul, to Solvay & Cie. Flexible compositions based on vinyl chloride polymers comprising poly-ε-caprolactone. 4,889,892, Cl. 525-186.000.

Malhi, Satwinder S., to Texas Instruments Incorporated. dRAM cell and array. 4,890,145, Cl. 357-23.600.

Malmros Holding, Inc.: *See*—
Vago, Robert E., 4,888,834, Cl. 4-540.000.

Maltman, William R.: *See*—
Ormsby, Mary E.; and Maltman, William R., 4,889,413, Cl. 350-354.000.

Mamiya, Hirokuni: *See*—
Hirata, Atsuomi; and Mamiya, Hirokuni, 4,890,152, Cl. 357-72.000.

Man, Henry H., to Continental Engineering Co., Inc. Insulated and non-metallic transparent and fully sealed louver system. 4,889,040, Cl. 98-121.200.

Manabe, Yukio: *See*—
Ohtsubo, Toshiro; Tsuda, Shigenori; Manabe, Yukio; Kasamatsu, Kiyoshi; Takeda, Hisami; and Tsuji, Kozo, 4,889,719, Cl. 424-408.000.

Mandell, Russell F., to Emhart Industries, Inc. Control valve for a mandrel collection system. 4,888,974, Cl. 72-391.000.

Mandy, Robert R. Down lighting systems and fixtures therefor. 4,890,200, Cl. 362-20.000.

Manera, Roberto: *See*—
Nigris, Giovanni; and Manera, Roberto, 4,889,178, Cl. 164-448.000.

Maney, John J., to Harris Corporation. Digital pulse width modulation control of brushless DC motors. 4,890,047, Cl. 318-661.000.

Mangal, Norman F.: *See*—
Gardiner, Kenneth W.; Hori, Tatsu; and Mangal, Norman F., 4,890,135, Cl. 355-299.000.

Mangiaracina, Pietro: *See*—
Saksena, Anil K.; Wong, Jesse K.; and Mangiaracina, Pietro, 4,889,873, Cl. 514-560.000.

Mani, Daniel, to International Baking Co., Inc. Apparatus for the manufacture of perforated pita bread and method of manufacturing the same. 4,889,043, Cl. 99-450.200.

Mannesmann Aktiengesellschaft: *See*—
Gomoll, Gunter; and Hauslaib, Wolfgang, 4,889,270, Cl. 226-181.000.

Marchant, Ian M., to GH International Ltd. Rail clip assembly. 4,889,282, Cl. 238-347.000.

Marconoi Electronic Devices Limited: *See*—
Ondria, John, 4,890,074, Cl. 331-107.0SL.

Marcus, Stephen L.: *See*—
Hou, Janpu; Chai, Bruce H.; Badding, David D.; West, Gary A.; and Marcus, Stephen L., 4,889,993, Cl. 250-365.000.

Margittai, Agnes: *See*—
Springthorpe, Anthony J.; Margittai, Agnes; and Eger, David, 4,889,830, Cl. 437-167.000.

Mariani, Beniamino; and Bortolin, Bruno, to Societa Cavi Pirelli S.p.A. Expanded beam connector for optical fibers. 4,889,399, Cl. 350-96.200.

Markhata, Gaynor P. Header bar for awning structure. 4,888,921, Cl. 52-63.000.

Markle, David R.; Crane, Barry C.; and Irvine, Michael P., to Biomedical Sensors Limited. Optical waveguide sensor and method of making same. 4,889,407, Cl. 350-96.290.

Martens, John A.: *See*—
Chernega, John G.; Martens, John A.; Olsen, Roger A.; and Cottingham, Auburn B., deceased, 4,889,895, Cl. 525-278.000.

Marti, Jordi: *See*—
Datta, Amitava; Davis, Lance A.; DeCristofaro, Nicholas J.; and Marti, Jordi, 4,889,568, Cl. 148-108.000.

Martin Archery, Inc.: *See*—
Martin, Terry G., 4,889,102, Cl. 124-88.000.

Martin, John W.: *See*—
Bryan, David E.; Dudding, Carl M.; and Martin, John W., 4,888,990, Cl. 73-326.000.

Martin Merkel GmbH & Co KG: *See*—
Muller, Heinz K., 4,889,349, Cl. 277-85.000.

Martin, Terry G., to Martin Archery, Inc. Archery bow with slotted bow handle and attachment recess. 4,889,102, Cl. 124-88.000.

Martinez, David R.: *See*—
Crews, Gary A.; and Martinez, David R., 4,890,264, Cl. 367-45.000.

Martos, Jesus J.: *See*—
Felker, Michael A.; Viverito, Angelo N.; Gilstrap, John W.; Martos, Jesus J.; Trujillo, Ruben; and Wang, Chang J., 4,890,278, Cl. 370-17.000.

Marulic, Walter J. Gutter anti-clogging device. 4,888,920, Cl. 52-12.000.

Marumo, Chihiro; Toida, Yoichi; Nemoto, Masatsugu; Iida, Junichi; and Sakuma, Kenji, to Mitutoyo Corporation. Levelling device of roughness measuring machine. 4,888,984, Cl. 73-105.000.

Maruta, Fumio: *See*—
Yokoyama, Kenji; Nakayama, Masatoshi; Shimozawa, Toru; Ueda, Kunihiro; and Maruta, Fumio, 4,889,767, Cl. 428-336.000.

Maruyama, Yuji: *See*—
Nakazato, Katsuo; Tsuchiya, Hiroyoshi; Kurosawa, Toshiharu; Maruyama, Yuji; and Takahashi, Kiyoshi, 4,890,167, Cl. 358-443.000.

Marzioli, Pietro B. Roving frame apparatus for removing bobbins and replacing removed bobbins with empty tubes. 4,888,946, Cl. 57-267.000.

Masaki, Takashi, to Hirose Electric Co., Ltd. Apparatus for mounting cable on a connector. 4,888,864, Cl. 29-753.000.

Masatate, Akihiko: *See*—
Honma, Masayuki; and Masatate, Akihiko, 4,889,083, Cl. 123-52.0MV.

Maschinebau Oppenweiler Binder GmbH & Co.: *See*—
Kuhn, Wolf, 4,890,060, Cl. 324-239.000.

Maschinenfabrik Moenus-Turner gmbH: *See*—
Zapfel, Horst; and Cabelmann, Erich, 4,888,966, Cl. 69-41.000.

Mashiko, Kimio: *See*—
Tateno, Atsushi; and Mashiko, Kimio, 4,889,144, Cl. 131-337.000.

Masler, William F.: *See*—
Amjad, Zahid; and Masler, William F., 4,889,637, Cl. 210-701.000.

Mason, John Y.; Hicks, Bruce W.; and English, Donald C., to Rio Linda Chemical Company, Inc. Aqueous foam disinfectant containing chlorine dioxide and preparation and use thereof. 4,889,654, Cl. 252-100.000.

Massachusetts Institute of Technology: *See*—
Chen, Chenson K.; and Tsaur, Bor-Yeu, 4,889,583, Cl. 156-604.000.
Smith, Henry I.; Anderson, Erik H.; and Schattenburg, Mark L., 4,890,309, Cl. 378-35.000.

Masuda, Ikuro; Kato, Kazuo; Sasayama, Takao; Nishio, Yoji; Kuboki, Shigeo; and Iwamura, Masahiro, to Hitachi, Ltd. CMOS-BiCMOS gate circuit. 4,890,017, Cl. 307-446.000.

Masuda, Katsuhiko: *See*—
Hamada, Tetsuro; Shimada, Kazuhiko; Masuda, Katsuhiko; and Shibuya, Kazunori, 4,889,353, Cl. 180-233.000.

Masuda, Yoshinobu: *See*—
Uno, Hitoshi; Kurokawa, Mikio; Sato, Fuminori; Naruto, Shunsuke; and Masuda, Yoshinobu, 4,889,858, Cl. 514-254.000.

Masui, Susumu: *See*—
Okada, Susumu; Imanaka, Makoto; Masui, Susumu; Obara, Takashi; Shinozaki, Masatoshi; and Tsunoyama, Kozo, 4,889,566, Cl. 148-2.000.

Mathews, Derek, to Apsley Metals Limited. Tire reinforcing component. 4,889,173, Cl. 152-528.000.

Mathias, Lon J.; and Kusefoglu, Selim H., to University of Southern Mississippi. Acrylate ester ether derivatives. 4,889,948, Cl. 560-181.000.

Mathias, Milton W.; and Wilda, Douglas W., to Honeywell Inc. Absolute pressure transducer and method for making same. 4,888,992, Cl. 73-727.000.

Matsubara, Chiaki; Ishikawa, Hirokuni; and Ojima, Masao, to Kabushiki Kaisha Yaskawa Denki Seisakusho. Fault current limiting device. 4,890,186, Cl. 361-103.000.

Matsuda, Eiji: *See*—
Sasaki, Hideki; Matsuoka, Shigeru; Matsuda, Eiji; Yonenaga, Hitoshi; and Fukushima, Masahito, 4,890,256, Cl. 364-900.000.

Matsuda, Yasuo: *See*—
Miyazaki, Hideki; Onda, Kenichi; and Matsuda, Yasuo, 4,890,009, Cl. 307-270.000.

Matsuda, Yoshio: *See*—
Hidaka, Hideto; Fujishima, Kazuyasu; and Matsuda, Yoshio, 4,890,261, Cl. 365-73.000.

Matsui, Sadayoshi: *See*—
Taneya, Mototaka; Takahashi, Kosei; Hayakawa, Toshiro; Matsui, Sadayoshi; Matsumoto, Mitsuhiro; and Hosoba, Hiroyuki, 4,890,293, Cl. 372-46.000.

Matsui, Yosuke: *See*—
Kobata, Tomokazu; and Matsui, Yosuke, 4,889,785, Cl. 430-59.000.

Matsumoto, Mitsuhiro: *See*—
Taneya, Mototaka; Takahashi, Kosei; Hayakawa, Toshiro; Matsui, Sadayoshi; Matsumoto, Mitsuhiro; and Hosoba, Hiroyuki, 4,890,293, Cl. 372-46.000.

Matsumoto, Yoshikane; Hiki, Toshio; and Kurosawa, Makoto, to Hitachi Koki Company, Limited. Paper feed control for a dot-line printer. 4,889,052, Cl. 101-93.040.

Matsumura, Yasuo: *See*—
Shimizu, Isoo; Matsumura, Yasuo; and Arai, Yutaka, 4,889,952, Cl. 562-460.000.

Matsuoka, Shigeru: *See*—
Sasaki, Hideki; Matsuoka, Shigeru; Matsuda, Eiji; Yonenaga, Hitoshi; and Fukushima, Masahito, 4,890,256, Cl. 364-900.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Kawai, Naoki; Hamamoto, Kouji; and Hosokawa, Tomiaki, 4,889,969, Cl. 219-130.510.
Nakazato, Katsuo; Tsuchiya, Hiroyoshi; Kurosawa, Toshiharu; Maruyama, Yuji; and Takahashi, Kiyoshi, 4,890,167, Cl. 358-443.000.
Yamashita, Ichiro; and Takeda, Mamoru, 4,890,097, Cl. 340-719.000.

Matsushita Electric Works, Ltd.: *See*—
Fujikawa, Shouji; Araki, Masakatsu; Kumano, Fumihiro; and Tsujimura, Shinichirou, 4,888,870, Cl. 30-233.500.
Hirata, Atsuomi; and Mamiya, Hirokuni, 4,890,152, Cl. 357-72.000.

Matsuzawa, Hideki: *See*—
Kikuchi, Yasushi; and Matsuzawa, Hideki, 4,889,564, Cl. 134-21.000.

Matukura, Motoo: *See*—
Murakami, Koji; Nakatsubo, Fumiaki; Katsura, Yoshiaki; and Matukura, Motoo, 4,889,927, Cl. 536-18.600.

Mauser-Werke Oberndork GmbH: *See*—
Band, Gerhard; and Broghammer, Heinz, 4,889,519, Cl. 474-101.000.

Mauz, Gerhard: *See*—
Gerstle, Volker; and Mauz, Gerhard, 4,889,781, Cl. 430-25.000.

Mavunkel, Babu J.: *See*—
Rzeszotarski, Waclaw J.; and Mavunkel, Babu J., 4,889,860, Cl. 514-282.000.

Max Planck Gesellschaft: *See*—
Opitz, Norbert; and Lubbers, Dietrich W., 4,889,690, Cl. 422-73.000.

Maynard, Buford: *See*—
Crossan, Jimmey; Maynard, Buford; and Tew, Dennis, 4,889,214, Cl. 192-17.00R.

Mazada Motor Corporation: *See*—
Nishiyama, Yukinori; Fujioka, Hideaki; Yamaguchi, Hisaaki; Ikeda, Toshiki; and Miyoshi, Keisuke, 4,889,093, Cl. 123-400.000.

Mazda Motor Corporation: *See*—
Aso, Seiichi, 4,889,379, Cl. 296-65.100.
Hitomi, Mitsuo; Yuzuriha, Yasuhiro; Hattori, Toshihiko; and Yamashita, Akinori, 4,889,082, Cl. 123-52.00M.

McCallum, Robert S.; and Hendrikx, Dale E., to Delphax Systems. Print cartridge. 4,890,123, Cl. 346-159.000.

McClure, Douglas M.: *See*—
Kerzich, Anthony A.; and McClure, Douglas M., 4,889,168, Cl. 138-103.000.

McComas, Charles C., to United Technologies Corporation. Gaseous removal of ceramic coatings. 4,889,589, Cl. 156-646.000.

McCure, James O. Cut tree stand. 4,889,309, Cl. 248-524.000.

McDonnell Douglas Helicopter Company: *See*—
Peck, John H., 4,889,031, Cl. 89-33.200.

McFadden, Edward A.: *See*—
Ausschnitt, Christopher P.; McFadden, Edward A.; and Tan, Raul V., 4,890,239, Cl. 364-491.000.

McGovern, Thomas F.: *See*—
Reger, Steven I.; Neth, Donald C.; and McGovern, Thomas F., 4,890,235, Cl. 364-468.000.

McKamey, Porter L.; and Maeder, Phillip M. Swimming pool cleaning mechanism. 4,888,842, Cl. 15-1.700.

McKee, Jere L.; Beatty, William E., Jr.; and Thomas, Glenn R., to Westinghouse Electric Corp. CT quick change assembly. 4,890,081, Cl. 335-18.000.

McLaughlin Manufacturing Company: *See*—
Shy, Max H., 4,889,193, Cl. 175-62.000.

McLeod, Rick: *See*—
Smith, Ronald J.; Lerch, Thomas J.; and McLeod, Rick, 4,888,843, Cl. 15-98.000.

McMichael, Dannie L., to Lancer Corporation. Cold plate apparatus. 4,888,961, Cl. 62-398.000.

McMichael, James W.; and Door, Robert D., to Dow Chemical Company, The. Method for making an improved supported membrane/electrode structure combination wherein catalytically active particles are coated onto the membrane. 4,889,577, Cl. 156-281.000.

McMoore, Clarence J., Jr.; and Graham, Melba T., to Hughes Aircraft Company. Optical fiber sleeving guide. 4,889,295, Cl. 242-118.300.

McNeal, Jack D.; Levine, Mark; and Beery, J. Harvey, to Beckman Instruments, Inc. Analytical apparatus, electrode and sample container for use therewith. 4,889,613, Cl. 204-416.000.

McNeely, David L.; and Fling, Russell T., to RCA Licensing Corporation. Adjustable antialias filters. 4,890,162, Cl. 358-138.000.

McPherson, Donald L.; and McPherson, Tony L., to McPherson Systems, Inc. Refractory bin for pit burning. 4,889,061, Cl. 110-336.000.

McPherson Systems, Inc.: *See*—
McPherson, Donald L.; and McPherson, Tony L., 4,889,061, Cl. 110-336.000.

McPherson, Tony L.: *See*—
McPherson, Donald L.; and McPherson, Tony L., 4,889,061, Cl. 110-336.000.

McSwain, Gregory D. Trowel vise. 4,889,330, Cl. 269-95.000.

Mead Corporation, The: *See*—
Duke, Ronald J.; and Beery, Jack, 4,889,293, Cl. 242-75.510.

Meador, Neil A., to Permanent Label Corporation. Apparatus and method for decorating tubular containers and like items. 4,889,050, Cl. 101-38.100.

Mec-Prec Mecanica De Precisao Industria E Comercio Ltda.: *See*—
Klabin, Mauricio, 4,889,279, Cl. 232-15.000.

Medical Products Development Inc.: *See*—
Quaid, Joel, 4,889,744, Cl. 427-2.000.

Medinger, Bernhard: *See*—
Bugnon, Philippe; and Medinger, Bernhard, 4,889,562, Cl. 106-204.000.

Mega, Christopher A.: *See*—
Ellis, Ronald M., Jr.; Wiesler, Oren L.; and Mega, Christopher A., 4,890,225, Cl. 364-200.000.

Megamation Incorporated: *See*—
Hoffman, Brian D.; and Pollack, Steven H., 4,890,241, Cl. 364-513.000.

Meguro, Satoshi: *See*—
Ikeda, Shuji; Nagasawa, Kouichi; Meguro, Satoshi; and Yamamoto, Sho, 4,890,148, Cl. 357-45.000.

Mei Tai Co., Ltd.: *See*—
Niemzig, Hajo, 4,889,628, Cl. 210-386.000.

Meier, Patricia A.; Meier, W. Jeff; and Woodland, Brent J., to Conoco Inc. Fractionating column control apparatus and methods. 4,889,600, Cl. 203-2.000.

Meier, W. Jeff: *See*—
Meier, Patricia A.; Meier, W. Jeff; and Woodland, Brent J., 4,889,600, Cl. 203-2.000.

Meighen, Terrence: *See*—
Philippson, Walter M.; Brennan, Robert J.; and Meighen, Terrence, 4,889,503, Cl. 439-610.000.

Meijboom, Nicolaas: *See*—
Van Doorn, Johannes A.; and Meijboom, Nicolaas, 4,889,956, Cl. 568-13.000.

Meijer, Sjoerd. Heat exchanger and sheet material therefor. 4,889,181, Cl. 165-78.000.

Meiko Electronics Co., Ltd.: *See*—
Wada, Tatsuo; Miki, Toshiro; and Takenaka, Masamitsu, 4,889,584, Cl. 156-630.000.

Meilleur, Serge. Insulating formwork for casting a concrete wall. 4,888,931, Cl. 52-426.000.

Meinander, Paul O., to Valmet Paper Machinery Inc. Method and apparatus for coating a web. 4,889,073, Cl. 427-356.000.

Meister, John J. Soluble or crosslinked graft copolymers of lignin acrylamide and 2-hydroxyethylmethacrylate. 4,889,902, Cl. 527-400.000.

Melcher, Franz-Josef: *See*—
Oldendorf, Christian; Berg, Christoph; and Melcher, Franz-Josef, 4,890,246, Cl. 364-567.000.

Melen, Riccardo: *See*—
Balboni, Gian P.; Giandonato, Giuseppe; Melen, Riccardo; and Vercellone, Vinicio, 4,890,281, Cl. 370-60.000.

Memron, Inc.: *See*—
Browne, Ronnie, 4,889,626, Cl. 210-359.000.

Menown, Hugh; Baker, Robert E.; and Cullum, Leonard R., to English Electric Valve Company Limited. Thyratrons. 4,890,034, Cl. 313-595.000.

Mensing, Walter: *See*—
Goral, Erhard; and Mensing, Walter, 4,889,037, Cl. 92-78.000.

Merck & Co., Inc.: *See*—
Tolman, Richard L.; Wagner, Arthur F.; Baldwin, John J.; and Pietruszkiewicz, Adolph, 4,889,856, Cl. 514-254.000.

Meredith, Roger J., to APV Magnetronics Limited. Apparatus for heating discrete packages of products using microwaves. 4,889,966, Cl. 219-10.55F.

Meredith, Thomas L.; and Garrett, Robert C. Roller chain wear gauge. 4,888,876, Cl. 33-501.080.

Merenda, Joseph T., to J. R. Microwave, Inc. Two wire adaptive system for interconnecting a four wire thermostat and a four wire, heating/cooling system. 4,889,179, Cl. 165-14.000.

Merryfield, David W.: *See*—
Lowrance, Dan E.; Douglas, Donald L.; and Merryfield, David W., 4,889,259, Cl. 221-75.000.

Mesdan S.p.A.: *See*—
Cottenceau, Remi; and Zurcher, Erwin, 4,888,943, Cl. 57-22.000.

Mesnel, Francois; and Mesnel, Gerard, to Etablissements Mesnel. Deformable sealing member. 4,888,917, Cl. 49-479.000.

Mesnel, Gerard: *See*—
Mesnel, Francois; and Mesnel, Gerard, 4,888,917, Cl. 49-479.000.

Messner Scott C.: *See*—
Geist, Jill M.; Messner Scott C.; and Schapira, Thomas G., 4,889,612, Cl. 204-416.000.

Metallgesellschaft Aktiengesellschaft: *See*—
Szekely, Ladislau, deceased; and Stieler, Fred, 4,889,555, Cl. 75-0.50R.

Metz, Michael; Tokarz, Joseph S.; and Jensen, Marvin E., to Hollister Incorporated. Female urinary incontinence device with forwardly-

directed discharge passage and support surface portions. 4,889,532, Cl. 604-330.000.
Metzen, Heinz, to A. Monforts GmbH & Co. Apparatus and method for shrink treating a textile fabric web. 4,888,860, Cl. 26-18.600.
Meyer, Norbert: *See*—
Lange, Arno; Wuerzer, Bruno; and Meyer, Norbert, 4,889,554, Cl. 71-118.000.
Meyer, Rolf-Volker: *See*—
Pielartzik, Harald; Ebert, Wolfgang; Meyer, Rolf-Volker; Traenckner, Hans-Joachim; and Ostlinning, Edgar, 4,889,911, Cl. 528-182.000.
Meyer, Serge-E-H, to Siemens Aktiengesellschaft. Hearing aid with interchangeable battery compartment and audio connection. 4,890,330, Cl. 381-69.200.
Meyer, Willy: *See*—
Waldner, Adrian; and Meyer, Willy, 4,889,933, Cl. 546-114.000.
Mezick, James A.: *See*—
Kligman, Albert M.; Mezick, James A.; and Capetola, Robert J., 4,889,847, Cl. 514-171.000.
Micco, Robert D.; and Williams, Howard M., Jr., to Hubbell Incorporated. Method of forming a tapped hole. 4,889,453, Cl. 408-1.00R.
Michel, Pirsoul, to Societe Uranium Pechiney, Framatome & Cogema, & Cie. Method of manufacturing uranium oxide base nuclear fuel pellets. 4,889,663, Cl. 264-0.500.
Michlin Diazo Products: *See*—
Greene, Michael; and Michlin, Norman, 4,890,136, Cl. 355-27.000.
Michlin, Norman: *See*—
Greene, Michael; and Michlin, Norman, 4,890,136, Cl. 355-27.000.
Micro Chemical, Inc.: *See*—
Pratt, William C., 4,889,433, Cl. 366-141.000.
Microelectronics and Computer Technology Corporation: *See*—
Smith, Lawrence N., 4,890,192, Cl. 361-313.000.
Mikhlin, Fira, legal representative: *See*—
Mikhlin, Josef A., deceased; Ikura, Michio; Kelly, James F.; and Capes, C. Edward, 4,889,538, Cl. 44-90.000.
Mikhlin, Josef A., deceased (by Mikhlin, Fira, legal representative); Ikura, Michio; Kelly, James F.; and Capes, C. Edward, to Minister of Energy, Mines and Resources Canada. Coal agglomeration beneficiation with heavy hydrocarbon oils and utilization thereof in coal/heavy oil coprocessing. 4,889,538, Cl. 44-90.000.
Miki, Toshiro: *See*—
Wada, Tatsuo; Miki, Toshiro; and Takenaka, Masamitsu, 4,889,584, Cl. 156-630.000.
Mildenberger, Hilmar: *See*—
Ehrhardt, Heinz; Mildenberger, Hilmar; Maier, Thomas; Schaller, Rainer; Sachse, Burkhard; and Braun. Peter, 4,889,864, Cl. 514-326.000.
Millar, Huntley D., to Pfizer Hospital Products. Doppler catheter. 4,889,128, Cl. 128-662.060.
Miller, Alan G., to Minnesota Mining and Manufacturing Company. Stabilized leuco phenazine dyes and their use in an imaging system. 4,889,932, Cl. 544-348.000.
Miller, Bernard F. Gas compressor with labyrinth sealing and active magnetic bearings. 4,889,039, Cl. 92-140.000.
Miller, Bernhard: *See*—
Beyer, Hans-Ernst; Bonitz, Jorg; Entenmann, Robert; Forster, Siegmar; Knab, Rochus; Kunzel, Walter; Kugler, Wolfgang; Mahlberg, Alfred; Miller, Bernhard; Philipp, Matthias; Rohde, Siegfried; Unland, Stefan; Viess, Walter; Winter, Herbert; and Zimmermann, Jurgen, 4,889,094, Cl. 123-414.000.
Miller, H. Richard, to Lubrizol Corporation, The. Modified asphalt compositions. 4,889,880, Cl. 524-71.000.
Miller, James G.; Pellet, Regis J.; Shamshoum, Edwar S.; and Rabo, Jule A., to UOP. Octane boosting. 4,889,616, Cl. 208-114.000.
Miller, L. Michael, to Frito-Lay, Inc. Multi-readable information system. 4,889,367, Cl. 283-88.000.
Miller, Lawrence J.: *See*—
Stein, William W.; and Miller, Lawrence J., 4,889,573, Cl. 156-89.000.
Miller, Michael K.; and Stockton, Warren D. Large capacity ammunition magazine. 4,888,898, Cl. 42-49.010.
Miller, Ray R. High heat flux roll and press utilizing same. 4,889,048, Cl. 100-93.0RP.
Milliken, Keith R.: *See*—
Loeb, David J.; and Milliken, Keith R., 4,890,240, Cl. 364-513.000.
Millionis, Konstantin: *See*—
Pusch, Hermann; Zeller, Siegfried; Millionis, Konstantin; and Kresl, Hans, 4,889,323, Cl. 266-142.000.
Mills, Gary N.: *See*—
Guinn, Perry W.; Mills, Gary N.; Bedient, Robert A.; and Greeley, Martin O., 4,889,812, Cl. 435-289.000.
Milowsky, Arnold S.: *See*—
Shepherd, Robin G.; Chai, Sie-Yearl; Lichty, Maynard E.; and Milowsky, Arnold S., 4,889,936, Cl. 548-149.000.
Minden, Percy: *See*—
Shinnick, Thomas M.; Minden, Percy; and Houghten, Richard A., 4,889,800, Cl. 435-7.000.
Mineart, Michael V. Flying disk with flexible center. 4,889,347, Cl. 273-424.000.
Minelab Electronic Industries Ltd.: *See*—
Candy, Bruce H., 4,890,064, Cl. 324-329.000.
Minimo, Ruben M. Foldable weather canopy for motor vehicles. 4,889,171, Cl. 150-166.000.
Minister of Energy, Mines and Resources Canada: *See*—
Mikhlin, Josef A., deceased; Ikura, Michio; Kelly, James F.; and Capes, C. Edward, 4,889,538, Cl. 44-90.000.
Minnesota Mining and Manufacturing Company: *See*—
Charbonneau, Jack W., 4,889,755, Cl. 428-42.000.
Chernega, John G.; Martens, John A.; Olsen, Roger A.; and Cottingham, Auburn B., deceased, 4,889,895, Cl. 525-278.000.
Flynn, Richard M.; and Savu, Patricia M., 4,889,656, Cl. 252-356.000.
Miller, Alan G., 4,889,932, Cl. 544-348.000.
Musser, Arlene K., 4,889,787, Cl. 430-166.000.
Palazzotto, Michael C., 4,889,792, Cl. 430-281.000.
Minolta Camera Kabushiki Kaisha: *See*—
Fujino, Akihiko; Ootsuka, Hiroshi; and Izumi, Tatsuro, 4,890,134, Cl. 354-442.000.
Hotomi, Hideo, 4,890,126, Cl. 346-140.00R.
Hyodo, Haruhiko, 4,890,137, Cl. 355-57.000.
Kumon, Toshihiko; and Nishioka, Nobuaki, 4,890,212, Cl. 363-49.000.
Miyamoto, Hirohisa; and Kinoshita, Naoyoshi, 4,890,138, Cl. 355-246.000.
Takebe, Kaoru, 4,890,139, Cl. 355-268.000.
Minoru, Isobe: *See*—
Yoshinori, Koshida; Minoru, Isobe; and Shin-ichi, Suto, 4,889,220, Cl. 194-206.000.
Mischke, Peter; and Schladetsch, Hans J., to Hoechst Aktiengesellschaft. AZO compounds containing cyano and vinyl-sulfone groups, a process for their preparation and their use as dyestuffs. 4,889,923, Cl. 534-597.000.
Misra, Sudhan S.; and Noveske, Terrence M., to C & D Power Systems, Inc. Alkali metal polysilica gel electrolyte lead-acid battery and method for making the same. 4,889,778, Cl. 429-190.000.
Mitchell, Terry L.; Sutton, Fredrick E.; and Sutton, Todd A., to G. A. Richards Company. Drawer interlock. 4,889,396, Cl. 312-221.000.
Mitre Corporation, The: *See*—
Mundra, Anand D., 4,890,232, Cl. 364-439.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Banjo, Toshinobu; Murasawa, Yasuhiro; and Onoda, Shigeo, 4,890,197, Cl. 361-392.000.
Hidaka, Hideto; Fujishima, Kazuyasu; and Matsuda, Yoshio, 4,890,261, Cl. 365-73.000.
Isozumi, Shuzoo, 4,890,026, Cl. 310-233.000.
Kanamori, Osamu, 4,889,222, Cl. 198-328.000.
Kimura, Masatoshi, 4,889,495, Cl. 439-60.000.
Kobayashi, Tetsuo; and Hayakawa, Masaharu, 4,890,169, Cl. 360-10.300.
Kondo, Shigeki, 4,889,015, Cl. 74-866.000.
Kumabe, Hisao, 4,890,292, Cl. 372-415.000.
Miyatake, Hideshi, 4,890,011, Cl. 307-296.200.
Mizuta, Masaharu, 4,889,498, Cl. 439-86.000.
Nishimae, Junichi; Yoshizawa, Kenji; Taki, Masakazu; Ueda, Yoshihiro; Yanagi, Tadashi; and Iwata, Akihiko, 4,890,294, Cl. 372-57.000.
Nitta, Yasuhiko; and Nakamura, Kazuo, 4,890,251, Cl. 364-715.080.
Numano, Yoshinori; and Hayama, Masahiro, 4,889,983, Cl. 250-211.00J.
Ohashi, Masato; and Kodai, Shiyoojiro, 4,889,749, Cl. 428-13.000.
Onishi, Masayoshi; and Fujimoto, Tadayuki, 4,889,033, Cl. 91-6.000.
Suzuki, Hiroyoshi; Nishiyama, Ryoji; and Nishida, Shinichi, 4,889,098, Cl. 123-489.000.
Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Seki, Yukuharu; and Haraguchi, Noriyasu, 4,889,580, Cl. 156-382.000.
Mitsubishi Kasei Corporation: *See*—
Noguchi, Masahiro; and Yamamoto, Osamu, 4,889,586, Cl. 156-636.000.
Mitsubishi Kinzoku Kabushiki Kaisha: *See*—
Mae, Yoshiharu; Oka, Tsutomu; and Hirano, Atsushi, 4,889,170, Cl. 148-407.000.
Mitsubishi MonsantoChemical Company: *See*—
Noguchi, Masahiro; and Yamamoto, Osamu, 4,889,586, Cl. 156-636.000.
Mitsubishi Paper Mills Limited: *See*—
Kosaka, Takao; Miyauchi, Masahiro; Koike, Naomasa; and Higuchi, Masahiro, 4,889,841, Cl. 503-209.000.
Mitsubishi Pencil Co., Ltd.: *See*—
Takagi, Hiroshi; Serikawa, Toshiaki; and Tsunoda, Noriaki, 4,889,442, Cl. 401-194.000.
Mitsubishi Petrochemical Co., Ltd.: *See*—
Suzuki, Yasuyosi, 4,889,669, Cl. 264-45.900.
Mitsui Petrochemical Industries Ltd.: *See*—
Uchiyama, Akira; and Okamoto, Katsuo, 4,889,762, Cl. 428-195.000.
Mitsui Toatsu Chemicals, Incorporated: *See*—
Oda, Kengo; Ishii, Tsutomu; Fukushi, Yukiharu; Enomoto, Yuji; Nishida, Makoto; and Hojo, Yoshikata, 4,889,551, Cl. 71-88.000.
Mitsuyuki, Kikyo: *See*—
Kei, Mori; Mitsuyuki, Kikyo; and Kouiti, Yabuki, 4,889,578, Cl. 156-294.000.
Mitutoyo Corporation: *See*—
Marumo, Chihiro; Toida, Yoichi; Nemoto, Masatsugu; Iida, Junichi; and Sakuma, Kenji, 4,888,984, Cl. 73-105.000.
Miura, Masakatsu: *See*—
Kuwayama, Yoshinari; Yokoyama, Fumitomo; and Miura, Masakatsu, 4,889,016, Cl. 74-868.000.
Miura, Norio: *See*—
Kotera, Noboru; Eguchi, Shusaku; and Miura, Norio, 4,889,996, Cl. 250-484.100.

Miwa, Hiroaki: *See*—
Horigome, Shinkichi; Niihara, Toshio; Ohta, Norio; Sugita, Yutaka; Miyamura, Yoshinori; Sudo, Ryoichi; Miwa, Hiroaki; and Tajima, Tetsuo, 4,889,757, Cl. 428-64.000.

Miyaaki, Tohru: *See*—
Maeda, Masao; Fukuse, Michiyo; Miyaaki, Tohru; and Miyake, Toshio, 4,889,728, Cl. 426-5.000.

Miyagawa, Fumio; Sakai, Hiroyuki; and Takenouchi, Toshikazu, to Shinko Electric Industries Co., Ltd. Package for mounting a semiconductor chip of ultra-high frequency. 4,890,155, Cl. 357-74.000.

Miyagi, Tatsuo: *See*—
Kojima, Hisashi; and Miyagi, Tatsuo, 4,889,667, Cl. 264-40.100.

Miyahara, Junji: *See*—
Hosoi, Yuichi; and Miyahara, Junji, 4,889,990, Cl. 250-327.200.

Miyake, Isao: *See*—
Koshida, Yoshinori; Miyake, Isao; Okazaki, Yasuo; Motoi, Nobuhiro; and Nakaya, Mitsuru, 4,889,978, Cl. 235-379.000.

Miyake, Toshio: *See*—
Maeda, Masao; Fukuse, Michiyo; Miyaaki, Tohru; and Miyake, Toshio, 4,889,728, Cl. 426-5.000.

Miyama, Hidetoshi; Sugimoto, Masanori; and Kawaguchi, Kouji, to Amada Company, Limited. Laser-punch composite processing machine. 4,889,968, Cl. 219-121.700.

Miyamoto, Hirohisa; and Kinoshita, Naoyoshi, to Minolta Camera Kabushiki Kaisha. Image forming apparatus having a plurality of developing devices. 4,890,138, Cl. 355-246.000.

Miyamoto, Yoshiyuki: *See*—
Takeda, Ryuzaburo; Koizumi, Hideaki; and Miyamoto, Yoshiyuki, 4,889,127, Cl. 128-653.000.

Miyamura, Yoshinori: *See*—
Horigome, Shinkichi; Niihara, Toshio; Ohta, Norio; Sugita, Yutaka; Miyamura, Yoshinori; Sudo, Ryoichi; Miwa, Hiroaki; and Tajima, Tetsuo, 4,889,757, Cl. 428-64.000.

Miyano, Seiji: *See*—
Tatsuoka, Toshio; Suzuki, Kenji; Satoh, Fumio; Miyano, Seiji; and Sumoto, Kunihiro, 4,889,853, Cl. 514-227.500.

Miyashita, Kunio: *See*—
Hashimoto, Ichiro; Ishizaki, Kosho; Hayashida, Hiroshi; and Miyashita, Kunio, 4,890,024, Cl. 310-49.00R.

Miyashita, Masahiko: *See*—
Kawabata, Takeo; Miyashita, Masahiko; and Taisha, Akira, 4,889,934, Cl. 546-151.000.

Miyatake, Hideshi, to Mitsubishi Denki Kabushiki Kaisha. On-chip substrate bias generating circuit having substrate potential clamp and operating method therefor. 4,890,011, Cl. 307-296.200.

Miyauchi, Masahiro: *See*—
Kosaka, Takao; Miyauchi, Masahiro; Koike, Naomasa; and Higuchi, Masahiro, 4,889,841, Cl. 503-209.000.

Miyazaki, Hideki; Onda, Kenichi; and Matsuda, Yasuo, to Hitachi, Ltd. Monolithic integrated circuit device. 4,890,009, Cl. 307-270.000.

Miyazawa, Takeshige: *See*—
Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; and Takahashi, Satoru, 4,889,552, Cl. 71-92.000.

Miyosawa, Yoshiaki: *See*—
Adaniya, Takeshi; Yamashita, Masaaki; Kubota, Takahiro; Enatsu, Akira; Nikaido, Norio; Miyosawa, Yoshiaki; and Nishimoto, Tadashi, 4,889,775, Cl. 428-62.00B.

Miyoshi, Keisuke: *See*—
Nishiyama, Yukinori; Fujioka, Hideaki; Yamaguchi, Hisaaki; Ikeda, Toshiki; and Miyoshi, Keisuke, 4,889,093, Cl. 123-400.000.

Miyoshi, Motosuke; and Okumura, Katsuya, to Kabushiki Kaisha Toshiba. Electron beam apparatus including plurality of ion pump blocks. 4,890,029, Cl. 313-7.000.

Mizuno Corporation: *See*—
Keijiro, Hayashi, 4,889,338, Cl. 273-73.00G.

Mizuta, Masaharu, to Mitsubishi Denki Kabushiki Kaisha. Memory card having an elastomer connector. 4,889,498, Cl. 439-86.000.

Mizutani, Tadashi: *See*—
Usuki, Arimitsu; Mizutani, Tadashi; Fukushima, Yoshiaki; Fujimoto, Megumi; Fukumori, Kenzo; Kojima, Yoshitsugu; Sato, Norio; Kurauchi, Toshio; and Kamigaito, Osami, 4,889,885, Cl. 524-445.000.

Mo och Domsjo Aktiebolag: *See*—
Gavelin, Gunnar, 4,889,594, Cl. 162-130.000.

Mobil Oil Corporation: *See*—
Chin, Arthur A.; Johnson, Ivy D.; Kresge, Charles T.; and Sarli, Michael S., 4,889,615, Cl. 208-113.000.
Chu, Pochen; Green, Larry A.; and Landis, Michael E., 4,889,839, Cl. 502-242.000.
Jones, Timothy A.; and Snavely, Earl S., Jr., 4,889,701, Cl. 423-220.000.

Mochida, Mitsuyoshi: *See*—
Takei, Hisashi; Ohmura, Hiroshi; Ushiro, Seimei; Mochida, Mitsuyoshi; Nakamura, Yoshihiko; Asano, Seiji; and Yoshida, Toshio, 4,890,130, Cl. 354-288.000.

Mochizuki, Kanji: *See*—
Murai, Yoshikazu; Yamaguchi, Tatsuo; and Mochizuki, Kanji, 4,889,649, Cl. 252-73.000.

Mody, Hemant K., to Eastman Kodak Company. Exposure control device. 4,890,129, Cl. 354-234.100.

Mohiuddin, Mahmood; Schneider, Barry L.; and Kay, Paul O., to Hollister Incorporated. Ostomy appliance with three-lement coupling ring assembly. 4,889,534, Cl. 604-339.000.

Moller, Jens T.; Jacobsen, Niels; Nielsen, Kirsten K.; and Rasmussen, Stig, to A/S Niro Atomizer. Process for removal or mercury vapor and/or vapor of noxious organic compounds and/or nitrogen oxides from flue gas from an incinerator plant. 4,889,698, Cl. 423-210.000.

Molnlycke AB: *See*—
Hanssen, Carl-Otto, 4,889,136, Cl. 128-855.000.

Molton, Peter M.: *See*—
Jensen, George A.; Nelson, David A.; and Molton, Peter M., 4,889,660, Cl. 252-646.000.

Monaco, Anthony. Labor saving lawn implement. 4,888,942, Cl. 56-400.010.

Monarch Marking Systems, Inc.: *See*—
Hartings, Michael F., 4,890,115, Cl. 343-742.000.

Monsanto Company: *See*—
Fields, Donald L., Jr.; and Grabiak, Raymond C., 4,889,906, Cl. 558-81.000.
Schaumann, Jon P.; Olander, Jitka V.; Hrakas, Nicholaos K.; and Feder, Joseph, 4,889,922, Cl. 530-413.000.

Monslow, H. Vincent; and Dickey, Steven R. Television broadcast system for selective transmission of viewer-chosen programs at viewer-requested times. 4,890,320, Cl. 380-10.000.

Mont-Bell Co., Ltd.: *See*—
Tatsuno, Isamu, 4,888,828, Cl. 2-69.500.

Montedipe S.p.A.: *See*—
Canova, Luciano; Giannini, Umberto; Albizzati, Enrico; Borghi, Italo; and Proto, Antonio, 4,889,896, Cl. 525-375.000.

Montedison S.p.A.: *See*—
Caporiccio, Gerardo; Strepparola, Ezio; and Scarati, Mario A., 4,889,939, Cl. 549-13.000.

Montijo, Alicia K. Scrubbing pail device. 4,888,847, Cl. 15-263.000.

Moore, Danny R.: *See*—
Herron, Carlisle M.; Dean, Walter L.; Moore, Danny R.; Owens, James W.; and Schoggen, Howard L., 4,889,595, Cl. 162-157.600.

Moore, Robert E.: *See*—
Yuhas, John M.; Goodman, Robert L.; and Moore, Robert E., 4,889,525, Cl. 600-1.000.

Morgan, Donald F., to Batts, Inc. Folding pant hanger. 4,889,265, Cl. 223-96.000.

Mori, Haruhisa, to Fujitsu Limited. Method of producing a semiconductor device. 4,889,820, Cl. 437-29.000.

Mori, Kunitaka, to NEC Corporation. Reading circuit in an optical disk apparatus. 4,890,275, Cl. 369-59.000.

Mori, Takashi: *See*—
Sasaki, Eiichi; Mori, Takashi; and Watanabe, Tetsuo, 4,890,120, Cl. 346-76.0PH.

Moriguchi, Akihiko: *See*—
Araki, Kazuhiko; Kuroda, Tsuyoshi; Uemori, Satoru; Moriguchi, Akihiko; and Ikeda, Yoshifumi, 4,889,857, Cl. 514-235.200.

Morinaga & Co., Ltd.: *See*—
Hara, Jun, 4,889,738, Cl. 426-572.000.

Morinaga, Kaoru: *See*—
Ono, Takuro; Aoyama, Noboru; and Morinaga, Kaoru, 4,890,276, Cl. 369-77.200.

Morris, Francis E. Trailer hitch ball assembly. 4,889,356, Cl. 280-416.100.

Morris, Jeffrey R.; and Burlingame, Nicholas H., to Hi-Tech Ceramics, Inc. Dual structure infrared surface combustion burner. 4,889,481, Cl. 431-328.000.

Morris, John L., to Bass Pro Shops, Inc. Tandem blade spinner bait. 4,888,908, Cl. 43-42.140.

Morris, Mae: *See*—
Buckner, Robert; and Morris, Mae, 4,890,269, Cl. 368-15.000.

Morris, Randall E. Concanavalin A dimers as therapeutic agents. 4,889,842, Cl. 514-8.000.

Morris, Sheldon A. Pipe repair device. 4,889,167, Cl. 138-99.000.

Morrison, Joseph L. Clamping plier with locking means. 4,889,021, Cl. 81-325.000.

Morse Controls Limited: *See*—
Crack, David J., 4,889,005, Cl. 74-501.600.

Morse, Harrod W.: *See*—
Crane, Robert A.; and Morse, Harrod W., 4,890,318, Cl. 379-399.000.

Morton Thiokol, Inc.: *See*—
Roos, Leo; Axon, Fredrick J.; and Briguglio, James J., 4,889,790, Cl. 439-258.000.
Willer, Rodney L.; Hartwell, James A.; and Gleeson, Robert G., 4,889,571, Cl. 149-19.900.

Moruta, Masaya: *See*—
Nakajima, Nobuyuki; Inomata, Kenichi; Moruta, Masaya; Yamaguchi, Toshio; and Eitai, Kazuo, 4,889,474, Cl. 417-295.000.

Mory, Yvez: *See*—
Revel, Michel; Rubinstein, Menachem; and Mory, Yvez, 4,889,803, Cl. 435-69.510.

Mos, Johannes: *See*—
Hartog, Jan; and Mos, Johannes, 4,889,852, Cl. 514-230.500.

Moser, Bernhard, to HAWERA Probst GmbH+Co. Rock drill. 4,889,200, Cl. 175-394.000.

Moser, Thomas: *See*—
Kippenberg, Horst; Moser, Thomas; and Otto, Klaus, 4,889,760, Cl. 428-192.000.

Mosser, Mark F., to Sermatech International, Inc. Coating compositions containing undissolved hexavalent chromium salt. 4,889,558, Cl. 106-14.120.

Motoi, Nobuhiro: *See*—
Koshida, Yoshinori; Miyake, Isao; Okazaki, Yasuo; Motoi, Nobuhiro; and Nakaya, Mitsuru, 4,889,978, Cl. 235-379.000.

Motorola, Inc.: *See*—
Barden, John M.; and Leung, Howard K. H., 4,889,492, Cl. 437-15.000.
Beutler, Scott D., 4,890,199, Cl. 361-424.000.
Cruess, Michael W.; Moyer, William C.; and Zolnowsky, John, 4,890,223, Cl. 364-200.000.
Drye, James E.; and Post, Steven L., 4,890,156, Cl. 357-74.000.
Duffalo, Joseph M.; and Lazar, Steven C., Jr., 4,890,069, Cl. 330-277.000.
Espe, Roy H.; and Ecklund, Lawrence M., 4,890,072, Cl. 331-11.000.
Mullen, William B., III; and Hendricks, Douglas W., 4,889,275, Cl. 228-180.200.
Parrillo, Louis C., 4,889,825, Cl. 437-34.000.
Teng, Ker-Wen; Wang, Karl L.; Nguyen, Bich-Yen; and Wu, Wei, 4,890,144, Cl. 357-23.400.
Tucker, Robert L.; and Staller, Joseph M., 4,889,590, Cl. 156-647.000.

Motoyama, Hiroshi: *See*—
Watanabe, Toshinori; Haruna, Koichi; Motoyama, Hiroshi; Nishigaki, Toru; Sasaki, Koji; Yakata, Teruo; and Watanabe, Yoshitaka, 4,890,227, Cl. 364-300.000.

Movats Incorporated: *See*—
Rak, Thomas A.; and Whitaker, T. Mark, 4,888,996, Cl. 73-862.190.

Moy, Michael: *See*—
Young, James R.; and Moy, Michael, 4,889,982, Cl. 235-494.000.

Moye, Lawrence D.: *See*—
Schmiedel, James P.; and Moye, Lawrence D., 4,889,505, Cl. 439-733.000.

Moyer, William C.: *See*—
Cruess, Michael W.; Moyer, William C.; and Zolnowsky, John, 4,890,223, Cl. 364-200.000.

Mozer, Claude. Navigation apparatus. 4,888,873, Cl. 33-1.0SD.

Mueller, Richard H.: *See*—
Godfrey, Jollie D.; Mueller, Richard H.; and Zahler, Robert, 4,889,930, Cl. 540-363.000.

Mueller, Werner, to Hermann Berstorff Maschinenbau GmbH. Planetary gear extruder for the compounding and extrusion of plastic materials. 4,889,430, Cl. 366-85.000.

Muilwijk, Dirk, to U.S. Philips Corp. Circuit for extracting carrier signals. 4,890,302, Cl. 375-80.000.

Mullen, William B., III; and Hendricks, Douglas W., to Motorola, Inc. Method for effecting solder interconnects. 4,889,275, Cl. 228-180.200.

Muller: *See*—
Enderle, Eckhard; Kaufmann, Dieter; Muller; and Andrzejewski, Thomas, 4,888,877, Cl. 33-559.000.

Muller, Alexander, to Deutsche Gelatinefabriken Stoess & Co. GmbH. Instantized gelatin soluble in cold water. 4,889,920, Cl. 530-355.000.

Muller, Heinz K., to Martin Merkel GmbH & Co KG. Sealing arrangement. 4,889,349, Cl. 277-85.000.

Multinorm B.V.: *See*—
Verbrugge, Jeroen K. J.; and Aurik, Erik A., 4,889,074, Cl. 119-14.030.

Multitest Elektronische Systeme: *See*—
Willberg, Hans H.; and Ueberreiter, Ekkehard, 4,889,242, Cl. 209-573.000.

Mundra, Anand D., to Mitre Corporation, The. Display aid for air traffic controllers. 4,890,232, Cl. 364-439.000.

Murai, Toshiaki: *See*—
Oshima, Katsuhide; Murai, Toshiaki; Sakurai, Hitoshi; Igarashi, Shuji; Hanagata, Haruo; and Igarashi, Hidesato, 4,889,602, Cl. 204-38.100.

Murai, Yoshikazu; Yamaguchi, Tatsuo; and Mochizuki, Kanji, to Nippon Petrochemicals Company, Ltd. Method for transmitting power. 4,889,649, Cl. 252-73.000.

Murakami, Koji; Nakatsubo, Fumiaki; Katsura, Yoshiaki; and Matukura, Motoo, to Jujo Paper Co., Ltd. Production process of phenylglycosides. 4,889,927, Cl. 536-18.600.

Murakami, Yoshio: *See*—
Ueda, Yoshio; Asakura, Sotoo; Murakami, Yoshio; and Nakate, Toshiomi, 4,889,721, Cl. 424-448.000.

Muraoka, Yutaka: *See*—
Kurakake, Mitsuo; Otsuka, Shoichi; and Muraoka, Yutaka, 4,890,100, Cl. 340-799.000.

Murasawa, Yasuhiro: *See*—
Banjo, Toshinobu; Murasawa, Yasuhiro; and Onoda, Shigeo, 4,890,197, Cl. 361-392.000.

Murata Kikai Kabushiki Kaisha: *See*—
Maeda, Yoshiyasu; Inoue, Yasuhiro; Uno, Toshiyuki; and Suzuki, Kazuyoshi, 4,888,945, Cl. 57-264.000.

Murata Manufacturing Co., Ltd.: *See*—
Yamamoto, Shinya; and Saito, Koichi, 4,889,229, Cl. 206-328.000.

Murata, Sunao: *See*—
Hayano, Fuminori; Imamura, Kazunori; Murata, Sunao; and Kato, Kinya, 4,889,998, Cl. 250-563.000.

Murayama, Ken: *See*—
Nagasawa, Kiyoshi; Ono, Kozo; Ogata, Kojiro; Murayama, Ken; and Hoshino, Yoshihiro, 4,888,878, Cl. 33-573.000.

Murdock, Inc.: *See*—
Comley, Peter N., 4,888,973, Cl. 72-342.000.

Muroi, Takahisa: *See*—
Fukushi, Isao; and Muroi, Takahisa, 4,890,018, Cl. 307-446.000.

Murphy, Richard D.; and Fischer, William C., to United Technologies Corporation. Backup control system (BUCS). 4,890,284, Cl. 371-9.100.

Murray, David P. Nutrient depleting envelopes containing aquatic plants. 4,888,912, Cl. 47-1.400.

Murray, Mark J.; and Kelly, James D., to ZymoGenetics, Inc. Biologically active PDGF derived A-chain homodimers. 4,889,919, Cl. 530-351.000.

Musser, Arlene K., to Minnesota Mining and Manufacturing Company. Low gain positive acting diazo oxide pre-press proofing system with polyvinyl ether and particulate slip agent in adhesive layer. 4,889,787, Cl. 430-166.000.

Musser, John H., to American Home Products Corporation. Aminoguanidine derivatives. 4,889,935, Cl. 546-176.000.

Musumeci, Salvatore; and Zambrano, Raffaele, to SGS-Thomson Microelectronics S.p.A. Manufacturing process for a monolithic integrated semiconductor device having multiple epitaxial layers with a low concentration of impurities. 4,889,822, Cl. 437-31.000.

Myers, Howard M., to Gilbarco, Inc. Power supply having combined forward converter and flyback action for high efficiency conversion from low to high voltage. 4,890,210, Cl. 363-21.000.

N & S Ltd.: *See*—
Nielsen, Thomas F., 4,889,343, Cl. 273-186.00A.

Naab, Jakob; and Gajewski, Arno, to Zoller-Kipper GmbH. Loading apparatus for emptying containers into a common receptacle. 4,889,462, Cl. 414-408.000.

Nabeta, Teruyuki: *See*—
Takei, Akira; Nabeta, Teruyuki; Nishikawa, Tetsuo; and Nagai, Eiichi, 4,890,164, Cl. 358-213.190.

Nadai, Tanekazu; and Kawara, Toshio, to Shimadzu Corporation; and Nadai, Tanekazu. Drip infusion rate control apparatus. 4,889,528, Cl. 604-65.000.

Nagai, Eiichi: *See*—
Takei, Akira; Nabeta, Teruyuki; Nishikawa, Tetsuo; and Nagai, Eiichi, 4,890,164, Cl. 358-213.190.

Naganawa, Tsutomu: *See*—
Ona, Isao; Naganawa, Tsutomu; Suzuki, Toshio; and Okawa, Tadashi, 4,889,770, Cl. 428-447.000.

Nagano, Masashi, to Shimano Industrial Company Limited. Multistage sprocket assembly for a bicycle. 4,889,521, Cl. 474-164.000.

Nagao, Tatsuro, to Pioneer Electronic Corporation. High speed information retrieval apparatus. 4,890,171, Cl. 360-73.050.

Nagasawa, Hikoshi: *See*—
Tanoshima, Katsuhide; and Nagasawa, Hikoshi, 4,890,230, Cl. 364-419.000.

Nagasawa, Kiyoshi; Ono, Kozo; Ogata, Kojiro; Murayama, Ken; and Hoshino, Yoshihiro, to Hitachi Construction Machinery Co., Ltd. Fine positioning device. 4,888,878, Cl. 33-573.000.

Nagasawa, Kouichi: *See*—
Ikeda, Shuji; Nagasawa, Kouichi; Meguro, Satoshi; and Yamamoto, Sho, 4,890,148, Cl. 357-45.000.

Nagata, Koji: *See*—
Takahashi, Takeshi; Nakamura, Masatake; Yabana, Yoshiji; Ishikawa, Toshiuyki; and Nagata, Koji, 4,889,958, Cl. 174-35.0MS.

Nagato, Hitoshi: *See*—
Hirahara, Shuzo; Nagato, Hitoshi; Higuchi, Kazuhiko; Yamada, Kiyoshi; Ohno, Tadayoshi; and Kanai, Tsutomu, 4,890,121, Cl. 346-76.0PH.

Nagawa, Yoshinobu; Honda, Koichi; and Nakanishi, Hiroshi, to Agency of Industrial Science and Technology. New indole derivatives and process for producing them. 4,889,937, Cl. 548-420.000.

Nagy, Gabor; and Neumann, Gyorgy, to Egyesult Izzolampa es Villamossagi RT. Clutch arrangement, mainly for driving the tape-spindle of magnetic tape recorder and/or play-back unit. 4,889,216, Cl. 192-48.400.

Nagy, Jozsef: *See*—
Balogh, Karoly; Dombay, Zsolt; Fodor, Karoly; Grega nee Toth, Erzebet; Lorik, Erno ; Magyar nee Tomorkenyi, Magdolna; Nagy, Jozsef; Pasztor, Karoly; Santha, Pal; Tarpai, Gyula; Toth, Istvan; and Urszin nee Simon, Eszter, 4,889,944, Cl. 558-171.000.

Nagy, Thomas. Box holder with handle. 4,889,376, Cl. 294-33.000.

Naitoh, Kazumi; Arakawa, Yoshiaki; Ikezaki, Takashi; Yabe, Shoji; Yokoyama, Yutaka; Hamaguchi, Yuichi; Roppongi, Yasunobu; and Hamaguchi, Yuichi, to Showa Denko Kabushiki Kaisha and Nippon Chemi-Con Corporation. Roll type solid electrolyte capacitor. 4,889,536, Cl. 29-570.100.

Najjar, Mitri S., to Texaco Inc. Partial oxidation process. 4,889,658, Cl. 252-373.000.

Najjar, Mitri S.; and Becker, Michael W., to Texaco Inc. Partial oxidation process. 4,889,699, Cl. 423-210.000.

Nakagaki, Shintaro: *See*—
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 4,890,124, Cl. 346-160.000.

Nakagawa, Yaoko; and Ishii, Koichi, to Hitachi, Ltd. Vector processing apparatus for incrementing indices of vector operands of different length according to arithmetic operation results. 4,890,220, Cl. 364-200.000.

Nakahira, Atsushi: *See*—
Niihara, Koichi; and Nakahira, Atsushi, 4,889,834, Cl. 501-89.000.
Niihara, Koichi; and Nakahira, Atsushi, 4,889,835, Cl. 501-89.000.

Nakajima, Nobuyuki; Inomata, Kenichi; Moruta, Masaya; Yamaguchi, Toshio; and Eitai, Kazuo, to Diesel kiki Co., Ltd. Air conditioning system with variable capacity compressor. 4,889,474, Cl. 417-295.000.

Nakamaki, Shin; and Sasahara, Yuzuru, to Tel Sagami Limited. Method of carrying objects into and from a furnace, and apparatus for carrying objects into and from a furnace. 4,888,994, Cl. 73-760.000.

Nakamura, Hiroshi: *See*—
Saito, Tadashi; Nakamura, Hiroshi; and Tsunotani, Masanori, 4,889,817, Cl. 437-22.000.
Nakamura, Katsuya: *See*—
Oku, Teruo; Todo, Eishiro; Kasahara, Chiyoshi; Nakamura, Katsuya; and Kayakiri, Hiroshi, 4,889,851, Cl. 514-223.200.
Nakamura, Kazuo: *See*—
Nitta, Yasuhiko; and Nakamura, Kazuo, 4,890,251, Cl. 364-715.080.
Nakamura Kiki Engineering Company Limited: *See*—
Hozumi, Kazuhiro; Arai, Masaru; and Saito, Yoshitane, 4,889,164, Cl. 137-625.640.
Nakamura, Masatake: *See*—
Takahashi, Takeshi; Nakamura, Masatake; Yabana, Yoshiji; Ishikawa, Toshiuyki; and Nagata, Koji, 4,889,958, Cl. 174-35.0MS.
Nakamura, Seishiro; Oukami, Katutoshi; and Asada, Masayuki, to Kuraray Co., Ltd. Granular inorganic moldings and a process for production thereof. 4,889,833, Cl. 501-1.000.
Nakamura, Shuji, to Tokyo Aircraft Instrument Co., Ltd. Rate-of-climb indicator. 4,890,103, Cl. 340-968.000.
Nakamura, Susumu; and Yokoi, Koichi, to Sankyo Engineering Co., Ltd. Slide core mold and injection molding. 4,889,480, Cl. 425-577.000.
Nakamura, Tadashi: *See*—
Iida, Hajime; and Nakamura, Tadashi, 4,889,967, Cl. 219-87.000.
Nakamura, Takeshi: *See*—
Machinami, Tomoya; Nakamura, Takeshi; Nishihata, Ken; Kondo, Shinichi; and Takeuchi, Tomio, 4,889,926, Cl. 536-6.400.
Nakamura, Yoshihiko: *See*—
Takei, Hisashi; Ohmura, Hiroshi; Ushiro, Seimei; Mochida, Mitsuyoshi; Nakamura, Yoshihiko; Asano, Seiji; and Yoshida, Toshio, 4,890,130, Cl. 354-288.000.
Nakamura, Yoshio: *See*—
Otsuki, Yasuo; and Nakamura, Yoshio, 4,889,493, Cl. 437-265.000.
Nakanishi, Hiroshi: *See*—
Nagawa, Yoshinobu; Honda, Koichi; and Nakanishi, Hiroshi, 4,889,937, Cl. 548-420.000.
Nakaniwa, Shinpei; Otani, Seiichi; Hamada, Toru; Osaki, Masanobu; Hoshino, Yukio; and Tomisawa, Naoki, to Japan Electronic Control Systems Company, Limited. Fuel injection control system for multicylinder internal combustion engine with feature of improved response characteristics to acceleration enrichment demand. 4,889,100, Cl. 123-492.000.
Nakano, Hiroshi: *See*—
Higashi, Kazutada; Tokuda, Masamori; Nakano, Hiroshi; and Ohta, Tomozo, 4,890,076, Cl. 332-170.000.
Nakano, Tasuku: *See*—
Izawa, Minoru; Hamamoto, Tadanao; Ishikawa, Masaru; Dohke, Harumi; and Nakano, Tasuku, 4,890,037, Cl. 315-77.000.
Nakao, Tsugio: *See*—
Fukushima, Tsutomu; Nakao, Tsugio; Yamashita, Kasane; Komuro, Takao; and Nishi, Katsuhiro, 4,889,697, Cl. 423-140.000.
Nakashima, Toshihide: *See*—
Tanihara, Masao; Oka, Kiichiro; Yamada, Hideaki; Kobayashi, Akira; Nakashima, Toshihide; Omura, Yoshiaki; and Takakura, Koichi, 4,889,917, Cl. 530-324.000.
Nakate, Toshiomi: *See*—
Ueda, Yoshio; Asakura, Sotoo; Murakami, Yoshio; and Nakate, Toshiomi, 4,889,721, Cl. 424-448.000.
Nakatsubo, Fumiaki: *See*—
Murakami, Koji; Nakatsubo, Fumiaki; Katsura, Yoshiaki; and Matukura, Motoo, 4,889,927, Cl. 536-18.600.
Nakaya, Mitsuru: *See*—
Koshida, Yoshinori; Miyake, Isao; Okazaki, Yasuo; Motoi, Nobuhiro; and Nakaya, Mitsuru, 4,889,978, Cl. 235-379.000.
Nakayama, Masatoshi: *See*—
Yokoyama, Kenji; Nakayama, Masatoshi; Shimozawa, Toru; Ueda, Kunihiro; and Maruta, Fumio, 4,889,767, Cl. 428-336.000.
Nakazato, Katsuo; Tsuchiya, Hiroyoshi; Kurosawa, Toshiharu; Maruyama, Yuji; and Takahashi, Kiyoshi, to Matsushita Electric Industrial Co., Ltd. Apparatus for processing image signal. 4,890,167, Cl. 358-443.000.
Naruto, Shunsuke: *See*—
Uno, Hitoshi; Kurokawa, Mikio; Sato, Fuminori; Naruto, Shunsuke; and Masuda, Yoshinobu, 4,889,858, Cl. 514-254.000.
Natale, Thomas, to GPAC, Inc. Asbestos scraper. 4,888,846, Cl. 15-236.010.
National Research Development Corporation: *See*—
de Ronde, Frans C., 4,890,117, Cl. 343-773.000.
National Research Institute for Metals: *See*—
Uda, Masahiro; Ohno, Satoru; and Okuyama, Hideo, 4,889,665, Cl. 264-10.000.
National Starch and Chemical Corporation: *See*—
Dust, Richard A.; and Causton, Peter, 4,889,884, Cl. 524-314.000.
Natsume, Takeshi: *See*—
Ishihara, Yasuoki; Obato, Fumio; Sakai, Jun; and Natsume, Takeshi, 4,889,687, Cl. 420-13.000.
Suenaga, Makoto; Obata, Fumio; Sakai, Jun; and Natsume, Takeshi, 4,889,688, Cl. 420-22.000.
Naumann, Emil: *See*—
Senft, Ernst; Klemmer, Herbert; Uhl, Ullrich; Naumann, Emil; and Schefcsik, Nikolaus, 4,889,007, Cl. 74-506.000.
Naumann, Klaus; and Behrenz, Wolfgang, to Bayer Aktiengesellschaft. 2,3,5,6-Tetrafluorobenzyl (+) 1r-trans-2,2-dimethyl-3-(2,2-dichlorovinyl)-cyclopropanecarboxylate. 4,889,872, Cl. 514-531.000.
NCR Corporation: *See*—
Beam, Don E.; and Sampson, Harold J., 4,890,198, Cl. 361-399.000.
Neudeck, Alexander J.; and Cordan, Ernest W., Jr., 4,890,010, Cl. 307-270.000.
NEC Corporation: *See*—
Hirata, Hideyuki, 4,890,280, Cl. 370-60.000.
Ishizuka, Hiromi, 4,890,045, Cl. 318-608.000.
Kuwahara, Yoshihiko, 4,890,110, Cl. 342-35.000.
Mori, Kunitaka, 4,890,275, Cl. 369-59.000.
Yamamoto, Hideki, 4,890,214, Cl. 363-49.000.
Nederlandse Organisatie Voor Toegepastnatuurwetenschappelijk Onderzoek Tno: *See*—
Van Veen, Jacobus J. F.; Konig, Johan W.; Ter Kuile, Willem M.; and Van Dijk, Cornelis, 4,889,427, Cl. 356-445.000.
Negoro, Ikuo; and Kita, Masahiro, to Asahi Kogaku Kogyo K.K. Image fixing apparatus. 4,890,140, Cl. 355-290.000.
Neher, Paul: *See*—
Scherzinger, Werner; and Neher, Paul, 4,888,963, Cl. 66-151.000.
Neibecker, Denis: *See*—
Grenouillet, Pierre; Neibecker, Denis; and Tkatchenko, Igor, 4,889,949, Cl. 560-202.000.
Neidich, Douglas A., to InterCon Systems, Inc. Compressible core electrical connector. 4,889,496, Cl. 439-75.000.
Neil, Alan; Hesketh, Gary W.; and Bojeck, Gary, to Blue Space Submersibles, Inc. Submersible vehicle. 4,889,066, Cl. 114-334.000.
Nelson, Craig H.; Dorsett, Thomas J.; and Davis, Charles L., to Protocol Systems, Inc. Method for noninvasive blood-pressure measurement by evaluation of waveform-specific area data. 4,889,133, Cl. 128-681.000.
Nelson, David A.: *See*—
Jensen, George A.; Nelson, David A.; and Molton, Peter M., 4,889,660, Cl. 252-646.000.
Nelson, Richard V.; and Stephen, John F., to ICI Americas Inc. Tetramethyl piperidyl terminated triazine oligomeric esters and amides. 4,889,882, Cl. 524-100.000.
Nemoto, Masatsugu: *See*—
Marumo, Chihiro; Toida, Yoichi; Nemoto, Masatsugu; Iida, Junichi; and Sakuma, Kenji, 4,888,984, Cl. 73-105.000.
Neoprobe Corporation: *See*—
Ramsey, Raymond C.; and Thurston, Marlin O., 4,889,991, Cl. 250-336.100.
Nerowski, Georg; Piepenbreier, Bernhard; and Toelle, Hans-Juergen, to Siemens Aktiengesellschaft. Short-circuit protection device for an electrical machine fed by a pulse-controlled A.C. converter. 4,890,181, Cl. 361-18.000.
Nespor, Jill M.: *See*—
Dave, Jayant C.; Record, David W.; Nespor, Jill M.; and Hook, Jeffrey S., 4,889,726, Cl. 426-3.000.
Dave, Jayant C.; Record, David W.; Nespor, Jill M.; and Hook, Jeffrey S., 4,889,727, Cl. 426-3.000.
Neth, Donald C.: *See*—
Reger, Steven I.; Neth, Donald C.; and McGovern, Thomas F., 4,890,235, Cl. 364-468.000.
Network Equipment Technologies, Inc.: *See*—
Lambert, Maureen K.; and Chrisman, Roger P., 4,890,282, Cl. 370-79.000.
Neudeck, Alexander J.; and Cordan, Ernest W., Jr., to NCR Corporation. Matched current source serial bus driver. 4,890,010, Cl. 307-270.000.
Neumann, Bernhard: *See*—
Kochy, Fritz; Neumann, Bernhard; and Horn, Rolf, 4,889,386, Cl. 297-359.000.
Neumann, Gyorgy: *See*—
Nagy, Gabor; and Neumann, Gyorgy, 4,889,216, Cl. 192-48.400.
New Hampshire Flakeboard, Inc.: *See*—
Caughey, Robert A., 4,888,885, Cl. 34-33.000.
New World Domestic Appliances Limited: *See*—
Gostelow, Benjamin F., 4,889,104, Cl. 126-299.00R.
Newcombe-Bond, William J., to Elliott, Graham Mervyn. Swimming pool skimmer. 4,889,622, Cl. 210-169.000.
Newcombe, Haydn J.; and Hird, John, to Armitage Shanks Limited. Fluid control valve. 4,889,162, Cl. 137-606.000.
Newcombe, Haydn J.; and Hird, John, to Armitage Shanks Limited. Water supply valves. 4,889,165, Cl. 137-801.000.
Newman, Hugh D., Jr.: *See*—
Jamiolkowski, Dennis D.; Gaterud, Mark T.; Newman, Hugh D., Jr.; and Shalaby, Shalaby W., 4,889,119, Cl. 606-220.000.
NGK Insulators, Ltd.: *See*—
Niihara, Koichi; and Nakahira, Atsushi, 4,889,834, Cl. 501-89.000.
Niihara, Koichi; and Nakahira, Atsushi, 4,889,835, Cl. 501-89.000.
Nguyen, Bich-Yen: *See*—
Teng, Ker-Wen; Wang, Karl L.; Nguyen, Bich-Yen; and Wu, Wei, 4,890,144, Cl. 357-23.400.
Nguyen, Qui Long: *See*—
Malfroid, Pierre; Nguyen, Qui Long; Blondin, Jean-Marie; and Burnay, Jean-Paul, 4,889,892, Cl. 525-186.000.
Nichia Kagaku Kogyo K.K.: *See*—
Ichinomiya, Keizi; Okada, Kouichi; Itsuki, Yuji; and Tsuchikura, Kaname, 4,890,033, Cl. 313-487.000.
Nicholson, Myron D.: *See*—
Hansen, James R.; Nicholson, Myron D.; and Sherry, Jeffrey B., 4,889,751, Cl. 428-34.800.
Nicolet, Richard; and Koch, Daniel, to ETA S.A. Fabriques d'Ebauches. Passive transponder. 4,890,111, Cl. 342-51.000.

Nielsen, Flemming E.: *See*—
Jacobsen, Poul; Nielsen, Flemming E.; and Honore, Tage, 4,889,855, Cl. 514-250.000.

Nielsen, Kirsten K.: *See*—
Moller, Jens T.; Jacobsen, Niels; Nielsen, Kirsten K.; and Rasmussen, Stig, 4,889,698, Cl. 423-210.000.

Nielsen, Thomas F., to N & S Ltd. Golf swing trainer. 4,889,343, Cl. 273-186.00A.

Niemzig, Hajo, to Mei Tai Co., Ltd. Belt-loading roller arrangement for the high pressure region in belt-filter presses. 4,889,628, Cl. 210-386.000.

Nigris, Giovanni; and Manera, Roberto, to Danieli & C. Officine Meccaniche SpA. Withdrawal and discharge device for a vertical continuous casting machine. 4,889,178, Cl. 164-448.000.

Nihon Den-Netsu Keiki Co., Ltd.: *See*—
Kondo, Kenshi, 4,889,273, Cl. 228-8.000.

Niihara, Koichi; and Nakahira, Atsushi, to NGK Insulators, Ltd. SiC-Al_2O_3 composite sintered bodies and method of producing the same. 4,889,834, Cl. 501-89.000.

Niihara, Koichi; and Nakahira, Atsushi, to NGK Insulators, Ltd. SiC-Al_2O_3 composite sintered bodies and method of producing the same. 4,889,835, Cl. 501-89.000.

Niihara, Toshio: *See*—
Horigome, Shinkichi; Niihara, Toshio; Ohta, Norio; Sugita, Yutaka; Miyamura, Yoshinori; Sudo, Ryoichi; Miwa, Hiroaki; and Tajima, Tetsuo, 4,889,757, Cl. 428-64.000.

Nikaido, Norio: *See*—
Adaniya, Takeshi; Yamashita, Masaaki; Kubota, Takahiro; Enatsu, Akira; Nikaido, Norio; Miyosawa, Yoshiaki; and Nishimoto, Tadashi, 4,889,775, Cl. 428-62.00B.

Nikkiso Co., Ltd.: *See*—
Ishikura, Kazuo, 4,889,468, Cl. 415-146.000.

Nikon Corporation: *See*—
Hayano, Fuminori; Imamura, Kazunori; Murata, Sunao; and Kato, Kinya, 4,889,998, Cl. 250-563.000.
Kimura, Keita; Takatsu, Norihiko; and Yamamoto, Tetsuya, 4,890,166, Cl. 358-228.000.
Yomoto, Masahiko; Uehara, Makoto; Ichikawa, Hajime; and Kato, Shigeru, 4,890,245, Cl. 364-557.000.

Nilssen, Ole K. Fluorescent lamp resonant ballast. 4,890,039, Cl. 315-119.000.

Nilsson, Harry. Filter for concentrating suspensions. 4,889,625, Cl. 210-331.000.

Nilsson, Kenth, to Siemens Aktiengesellschaft. Method and apparatus for increasing inking resolution in an ink mosaic recording device. 4,890,122, Cl. 346-140.00R.

Nilsson, Ulf C., to Nomafa AB. Device in roll-up doors. 4,889,176, Cl. 160-264.000.

Ninomiya, Hideaki: *See*—
Sawai, Kiichi; Kurono, Masayasu; Awaya, Juichi; Kojima, Akio; and Ninomiya, Hideaki, 4,889,715, Cl. 424-80.000.

Nintendo Co., Ltd.: *See*—
Yokoi, Gunpei, 4,889,027, Cl. 84-635.000.

Nippon Glass Fiber Co., Ltd.: *See*—
Inuzuka, Toshio; Hasegawa, Tsutomu; Tomikawa, Minato; and Aoki, Shigeru, 4,889,766, Cl. 428-324.000.

Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: *See*—
Kawabata, Takeo; Miyashita, Masahiko; and Taisha, Akira, 4,889,934, Cl. 546-151.000.

Nippon Kayaku Kabushiki Kaisha: *See*—
Yokoshima, Minoru; and Ohkubo, Tetsuo, 4,889,768, Cl. 428-429.000.

Nippon Kokan Kabushiki Kaisha: *See*—
Adaniya, Takeshi; Yamashita, Masaaki; Kubota, Takahiro; Enatsu, Akira; Nikaido, Norio; Miyosawa, Yoshiaki; and Nishimoto, Tadashi, 4,889,775, Cl. 428-62.00B.

Nippon Oil Co., Ltd.: *See*—
Tsuchiya, Shozo; Aoki, Nobuo; and Suzuki, Shinichiro, 4,889,791, Cl. 430-270.000.

Nippon Petrochemical Company, Ltd.: *See*—
Shimizu, Isoo; Matsumura, Yasuo; and Arai, Yutaka, 4,889,952, Cl. 562-460.000.

Nippon Petrochemicals Company, Ltd.: *See*—
Murai, Yoshikazu; Yamaguchi, Tatsuo; and Mochizuki, Kanji, 4,889,649, Cl. 252-73.000.

Nippon Seiki Co., Ltd.: *See*—
Kobayashi, Hisataka; Araki, Fujio; and Ohtani, Yoshihiro, 4,890,057, Cl. 324-140.00D.

Nippon Seiko Kabushiki Kaisha: *See*—
Yamamoto, Kazuo; and Ono, Katsuyasu, 4,889,363, Cl. 280-804.000.

Nippon Steel Corporation: *See*—
Higaki, Yuzo; Goto, Hiroyuki; and Tanikawa, Keiichi, 4,889,648, Cl. 252-49.500.
Yamaoka, Masayoshi; Tsutsui, Kiyomi; Inoue, Tadashi; and Takahashi, Toyoki, 4,888,993, Cl. 73-760.000.

Nippon Telegraph and Telephone Corporation: *See*—
Akuto, Keiji, 4,889,777, Cl. 429-162.000.

Nippondenso Co., Ltd.: *See*—
Takanabe, Kazunori; Yamamoto, Masaki; Ito, Kenzo; and Fujinami, Hiroshi, 4,890,104, Cl. 340-995.000.

Nishi, Katsuhiro: *See*—
Fukushima, Tsutomu; Nakao, Tsugio; Yamashita, Kasane; Komuro, Takao; and Nishi, Katsuhiro, 4,889,697, Cl. 423-140.000.

Nishida, Makoto: *See*—
Oda, Kengo; Ishii, Tsutomu; Fukushi, Yukiharu; Enomoto, Yuji; Nishida, Makoto; and Hojo, Yoshikata, 4,889,551, Cl. 71-88.000.

Nishida, Shinichi: *See*—
Suzuki, Hiroyoshi; Nishiyama, Ryoji; and Nishida, Shinichi, 4,889,098, Cl. 123-489.000.

Nishigaki, Toru: *See*—
Watanabe, Toshinori; Haruna, Koichi; Motoyama, Hiroshi; Nishigaki, Toru; Sasaki, Koji; Yakata, Teruo; and Watanabe, Yoshitaka, 4,890,227, Cl. 364-300.000.

Nishihata, Ken: *See*—
Machinami, Tomoya; Nakamura, Takeshi; Nishihata, Ken; Kondo, Shinichi; and Takeuchi, Tomio, 4,889,926, Cl. 536-6.400.

Nishikawa, Tetsuo: *See*—
Takei, Akira; Nabeta, Teruyuki; Nishikawa, Tetsuo; and Nagai, Eiichi, 4,890,164, Cl. 358-213.190.

Nishimae, Junichi; Yoshizawa, Kenji; Taki, Masakazu; Ueda, Yoshihiro; Yanagi, Tadashi; and Iwata, Akihiko, to Mitsubishi Denki Kabushiki Kaisha. Plasma apparatus. 4,890,294, Cl. 372-57.000.

Nishimoto, Tadashi: *See*—
Adaniya, Takeshi; Yamashita, Masaaki; Kubota, Takahiro; Enatsu, Akira; Nikaido, Norio; Miyosawa, Yoshiaki; and Nishimoto, Tadashi, 4,889,775, Cl. 428-62.00B.

Nishio, Yoji: *See*—
Masuda, Ikuro; Kato, Kazuo; Sasayama, Takao; Nishio, Yoji; Kuboki, Shigeo; and Iwamura, Masahiro, 4,890,017, Cl. 307-446.000.

Nishioka, Nobuaki: *See*—
Kumon, Toshihiko; and Nishioka, Nobuaki, 4,890,212, Cl. 363-49.000.

Nishiyama, Ryoji: *See*—
Suzuki, Hiroyoshi; Nishiyama, Ryoji; and Nishida, Shinichi, 4,889,098, Cl. 123-489.000.

Nishiyama, Yukinori; Fujioka, Hideaki; Yamaguchi, Hisaaki; Ikeda, Toshiki; and Miyoshi, Keisuke, to Sumitomo Electric Industries, Ltd.; and Mazada Motor Corporation. Throttle opening controller. 4,889,093, Cl. 123-400.000.

Niskanen, Juhani, to Valmet Paper Machinery, Inc. Method for detaching a web from a surface of a roll with inductive heating. 4,889,598, Cl. 162-199.000.

Nissan Motor Co., Ltd.: *See*—
Honma, Masayuki; and Masatate, Akihiko, 4,889,083, Cl. 123-52.0MV.
Kurozu, Tomotaka; and Kataoka, Sachiro, 4,890,038, Cl. 315-82.000.
Tahara, Hideo; Makihara, Novuo; and Ono, Hiroshi, 4,889,507, Cl. 440-61.000.
Uno, Takaaki; Yamahata, Hiroshi; and Chiba, Kazuo, 4,889,328, Cl. 267-293.000.

Nisshin Oil Mills, Ltd., The: *See*—
Higaki, Yuzo; Goto, Hiroyuki; and Tanikawa, Keiichi, 4,889,648, Cl. 252-49.500.

Nitta, Yasuhiko; and Nakamura, Kazuo, to Mitsubishi Denki Kabushiki Kaisha. Arithmetic shifter with sign extend facility. 4,890,251, Cl. 364-715.080.

Nixdorf Computer AG: *See*—
Esser, Wolfgang; and Jung, Peter, 4,890,095, Cl. 340-657.000.

NKK Corporation: *See*—
Fukushima, Tsutomu; Nakao, Tsugio; Yamashita, Kasane; Komuro, Takao; and Nishi, Katsuhiro, 4,889,697, Cl. 423-140.000.

Noah, Matthew J.: *See*—
Bertrand, John; and Noah, Matthew J., 4,890,327, Cl. 381-38.000.

Noda, Shigeo, to Toyoda Machine Works, Ltd. Tool holder for monitoring tool service time. 4,890,306, Cl. 377-15.000.

Nogan, John J., II: *See*—
Ramm, Edmund C.; and Nogan, John J., II, 4,888,845, Cl. 15-182.000.

Noguchi, Masahiro; and Yamamoto, Osamu, to Mitsubishi Monsanto Chemical Company; and Mitsubishi Kasei Corporation. Method for polishing AlGaAs surfaces. 4,889,586, Cl. 156-636.000.

Nokia Graetz: *See*—
Gerstle, Volker; and Mauz, Gerhard, 4,889,781, Cl. 430-25.000.

Nomafa AB: *See*—
Nilsson, Ulf C., 4,889,176, Cl. 160-264.000.

Nomix Manufacturing Company Ltd.: *See*—
Gill, David C., 4,889,001, Cl. 73-865.900.

Nomura, Hiroaki: *See*—
Inoue, Keizo; Nomura, Hiroaki; and Okutani, Tetsuya, 4,889,953, Cl. 564-293.000.

Nonaka, Satoshi: *See*—
Tanaka, Fuminari; and Nonaka, Satoshi, 4,890,016, Cl. 307-443.000.

Norand Corporation: *See*—
Conway, David W., 4,890,217, Cl. 363-143.000.

Nordholt, Ernst H.: *See*—
Straver, Willibrordus G. M. M.; and Nordholt, Ernst H., 4,890,066, Cl. 329-369.000.

Nordica S.P.A.: *See*—
Sartor, Mariano, 4,888,889, Cl. 36-117.000.

Norsk Hydro a.s.: *See*—
Boe, Einar, 4,889,197, Cl. 175-267.000.

North American Philips Corporation: *See*—
Carlson, Allan L., 4,890,101, Cl. 340-811.000.
Tsinberg, Mikhail; and Otto, Detlev, 4,890,283, Cl. 370-84.000.
Vera, Eduardo S.; and Stupp, Edward H., 4,890,150, Cl. 357-52.000.

Northern Telecom Limited: *See*—
Devries, Paul A., 4,890,305, Cl. 375-120.000.
Hagner, George R., 4,889,962, Cl. 174-68.500.
Springthorpe, Anthony J.; Margittai, Agnes; and Eger, David, 4,889,830, Cl. 437-167.000.

Noschese, Rocco: *See*—
Lazar, Michael; and Noschese, Rocco, 4,889,500, Cl. 439-579.000.

Nottbohm, Klaus: *See*—
Oldendorf, Christian; Maaz, Gunther; Nottbohm, Klaus; and Handwerk, Volker, 4,889,201, Cl. 177-25.140.

Nova Pharmaceutical Corporation: *See*—
Rzeszotarski, Waclaw J.; and Mavunkel, Babu J., 4,889,860, Cl. 514-282.000.

Noveske, Terrence M.: *See*—
Misra, Sudhan S.; and Noveske, Terrence M., 4,889,778, Cl. 429-190.000.

Nowakowski, Jerzy: *See*—
Elbaum, Marek; Gutkowicz-Krusin, Dina; and Nowakowski, Jerzy, 4,889,398, Cl. 350-3.670.

Nuckolls, Joe A.; and Payne, Paul E., to Hubbell Incorporated. High wattage HID lamp circuit. 4,890,041, Cl. 315-225.000.

Numano, Yoshinori; and Hayama, Masahiro, to Mitsubishi Denki Kabushiki Kaisha. Image sensor and production method thereof. 4,889,983, Cl. 250-211.00J.

Nykvist, Arline M.: *See*—
Gaffar, Abdul; Lau, Shek-Hong H.; Afflito, John; and Nykvist, Arline M., 4,889,712, Cl. 424-52.000.

Nystrom, Mats: *See*—
Janiszewski, Gzegorz; Sahlmen, Thomas; and Nystrom, Mats, 4,889,217, Cl. 192-48.910.

O. R. Concepts, Inc.: *See*—
Poettgen, Robert J., 4,889,135, Cl. 128-849.000.

Obara, Takashi: *See*—
Okada, Susumu; Imanaka, Makoto; Masui, Susumu; Obara, Takashi; Shinozaki, Masatoshi; and Tsunoyama, Kozo, 4,889,566, Cl. 148-2.000.

Obata, Fumio: *See*—
Suenaga, Makoto; Obata, Fumio; Sakai, Jun; and Natsume, Takeshi, 4,889,688, Cl. 420-22.000.

Obata, Keiichi; Yoshida, Suguru; Saitoh, Masahiro; and Ono, Yoshinobu, to Honda Giken Kogyo Kabushiki Kaisha. Casting a plastic windshield. 4,889,678, Cl. 264-313.000.

Obato, Fumio: *See*—
Ishihara, Yasuoki; Obato, Fumio; Sakai, Jun; and Natsume, Takeshi, 4,889,687, Cl. 420-13.000.

Obrist, Paul A.: *See*—
Hutcheson, J. Stanford; Lutz, Richard W.; Obrist, Paul A.; Flaugher, David J.; and Watts, Charles E., 4,889,132, Cl. 128-680.000.

Occidental Chemical Corporation: *See*—
Campbell, Donald H.; and Evarts, Gerald L., 4,889,773, Cl. 428-552.000.

Oda, Kengo; Ishii, Tsutomu; Fukushi, Yukiharu; Enomoto, Yuji; Nishida, Makoto; and Hojo, Yoshikata, to Mitsui Toatsu Chemicals, Incorporated. Isoxazoline derivatives and plant growth regulators. 4,889,551, Cl. 71-88.000.

Odier, Etienne: *See*—
Buswell, John A.; and Odier, Etienne, 4,889,807, Cl. 435-192.000.

O'Donnell, Matthew: *See*—
Smith, Lowell S.; Engeler, William E.; and O'Donnell, Matthew, 4,890,268, Cl. 367-138.000.

Ogata, Kojiro: *See*—
Nagasawa, Kiyoshi; Ono, Kozo; Ogata, Kojiro; Murayama, Ken; and Hoshino, Yoshihiro, 4,888,878, Cl. 33-573.000.

Ogawa, Ryota; Toji, Shigeo; Yoshida, Kazushi; and Okura, Zenichi, to Asahi Kogaku Kogyo K.K. Autofocus camera. 4,890,133, Cl. 354-402.000.

Ogiu, Hisao, to Olympus Optical Co., Ltd. Endoscope system and method of unifying picture images in an endoscope system. 4,890,159, Cl. 358-98.000.

Ogou, Sunoo; Ishii, Shigemichi; Tagomori, Sadaaki; Fukushima, Takuo; and Hayashida, Yasumasa, to Asahi Denka Kogyo Kabushiki Kaisha. Waterstop for concrete form separator. 4,889,312, Cl. 249-216.000.

Oguri, Hideo, to Kabushiki Kaisha Komatsu Seisakusho. Cylinder head for an internal combustion engine. 4,889,080, Cl. 123-41.82R.

Ohashi, Masato; and Kodai, Shiyoojiro, to Ryoden Kasei Co., Ltd.; and Mitsubishi Denki Kabushiki Kaisha. Identification card. 4,889,749, Cl. 428-13.000.

Ohashi, Yuichi: *See*—
Ikegawa, Akihiko; Ohashi, Yuichi; and Okazaki, Masaki, 4,889,796, Cl. 430-549.000.

Ohba, Hirokazu: *See*—
Okada, Eiichi; Ozawa, Akira; Kousaka, Tomomi; and Ohba, Hirokazu, 4,888,865, Cl. 29-568.000.

Ohkanda, Masao, to Kioritz Corporation. Anti-overload centrifugal clutch. 4,889,215, Cl. 192-48.100.

Ohkubo, Tetsuo: *See*—
Yokoshima, Minoru; and Ohkubo, Tetsuo, 4,889,768, Cl. 428-429.000.

Ohmura, Hiroshi: *See*—
Takei, Hisashi; Ohmura, Hiroshi; Ushiro, Seimei; Mochida, Mitsuyoshi; Nakamura, Yoshihiko; Asano, Seiji; and Yoshida, Toshio, 4,890,130, Cl. 354-288.000.

Ohno, Satoru: *See*—
Uda, Masahiro; Ohno, Satoru; and Okuyama, Hideo, 4,889,665, Cl. 264-10.000.

Ohno, Tadayoshi: *See*—
Hirahara, Shuzo; Nagato, Hitoshi; Higuchi, Kazuhiko; Yamada, Kiyoshi; Ohno, Tadayoshi; and Kanai, Tsutomu, 4,890,121, Cl. 346-76.0PH.

Ohshima, Toyoko: *See*—
Fukizawa, Kazunori; Ohshima, Toyoko; and Hata, Toshinobu, 4,889,774, Cl. 428-614.000.

Ohta, Norio: *See*—
Horigome, Shinkichi; Niihara, Toshio; Ohta, Norio; Sugita, Yutaka; Miyamura, Yoshinori; Sudo, Ryoichi; Miwa, Hiroaki; and Tajima, Tetsuo, 4,889,757, Cl. 428-64.000.

Ohta, Tomozo: *See*—
Higashi, Kazutada; Tokuda, Masamori; Nakano, Hiroshi; and Ohta, Tomozo, 4,890,076, Cl. 332-170.000.

Ohta, Yoshinori, to Olympus Optical Co., Ltd. Static induction transistor and manufacturing method of the same. 4,889,826, Cl. 437-40.000.

Ohtani, Yoshihiro: *See*—
Kobayashi, Hisataka; Araki, Fujio; and Ohtani, Yoshihiro, 4,890,057, Cl. 324-140.00D.

Ohtsu, Norio: *See*—
Kawamura, Hirotaka; Ohtsu, Norio; and Utiumi, Shinichiro, 4,889,943, Cl. 558-71.000.

Ohtsubo, Toshiro; Tsuda, Shigenori; Manabe, Yukio; Kasamatsu, Kiyoshi; Takeda, Hisami; and Tsuji, Kozo, to Sumitomo Chemical Company, Ltd. Microencapsulated organophosphorus insecticidal composition for agricultural use. 4,889,719, Cl. 424-408.000.

Ojima, Masao: *See*—
Matsubara, Chiaki; Ishikawa, Hirokuni; and Ojima, Masao, 4,890,186, Cl. 361-103.000.

Oka, Kiichiro: *See*—
Tanihara, Masao; Oka, Kiichiro; Yamada, Hideaki; Kobayashi, Akira; Nakashima, Toshihide; Omura, Yoshiaki; and Takakura, Koichi, 4,889,917, Cl. 530-324.000.

Oka, Tsutomu: *See*—
Mae, Yoshiharu; Oka, Tsutomu; and Hirano, Atsushi, 4,889,170, Cl. 148-407.000.

Okada, Eiichi; Ozawa, Akira; Kousaka, Tomomi; and Ohba, Hirokazu, to Honda Giken Kogyo Kabushiki Kaisha. Machine tool. 4,888,865, Cl. 29-568.000.

Okada, Kazuo, to Kabushiki Kaisha Universal. Slot machine. 4,889,339, Cl. 273-143.00R.

Okada, Kouichi: *See*—
Ichinomiya, Keizi; Okada, Kouichi; Itsuki, Yuji; and Tsuchikura, Kaname, 4,890,033, Cl. 313-487.000.

Okada, Susumu; Imanaka, Makoto; Masui, Susumu; Obara, Takashi; Shinozaki, Masatoshi; and Tsunoyama, Kozo, to Kawasaki Steel Corporation. Method for producing cold rolled steel sheets having improved spot weldability. 4,889,566, Cl. 148-2.000.

Okamoto, Katsuo: *See*—
Uchiyama, Akira; and Okamoto, Katsuo, 4,889,762, Cl. 428-195.000.

Okawa, Tadashi: *See*—
Ona, Isao; Naganawa, Tsutomu; Suzuki, Toshio; and Okawa, Tadashi, 4,889,770, Cl. 428-447.000.

Okazaki, Atsushi: *See*—
Sasamoto, Yasuhiko; Hasegawa, Shusaku; and Okazaki, Atsushi, 4,889,742, Cl. 426-643.000.

Okazaki, Koji: *See*—
Taniguchi, Tomohiko; Iseda, Kohei; Okazaki, Koji; Amano, Fumio; and Unagami, Shigeyuki, 4,890,325, Cl. 381-34.000.

Okazaki, Masaki: *See*—
Ikegawa, Akihiko; Ohashi, Yuichi; and Okazaki, Masaki, 4,889,796, Cl. 430-549.000.

Okazaki, Yasuo: *See*—
Koshida, Yoshinori; Miyake, Isao; Okazaki, Yasuo; Motoi, Nobuhiro; and Nakaya, Mitsuru, 4,889,978, Cl. 235-379.000.

Oki Electric Industry Co., Ltd.: *See*—
Kaifu, Katsuaki; Kosuge, Maki; Yamashita, Yoshio; Asano, takateru; and Kobayashi, Kenji, 4,889,795, Cl. 430-326.000.
Koshida, Yoshinori; Miyake, Isao; Okazaki, Yasuo; Motoi, Nobuhiro; and Nakaya, Mitsuru, 4,889,978, Cl. 235-379.000.
Saito, Tadashi; Nakamura, Hiroshi; and Tsunotani, Masanori, 4,889,817, Cl. 437-22.000.
Takahashi, Chusei, 4,890,332, Cl. 455-67.000.
Yoshinori, Koshida; Minoru, Isobe; and Shin-ichi, Suto, 4,889,220, Cl. 194-206.000.

Oki Electric Industry, Ltd.: *See*—
Endo, Hideaki, 4,890,022, Cl. 307-602.000.

Oki, Yasuhiro: *See*—
Fujiwara, Tadayoshi; Yamaoka, Yukio; Hamada, Kazuichi; Yamada, Yoshiro; Kawaguchi, Yasunobu; Oki, Yasuhiro; Taniguchi, Takashi; and Takahashi, Hiroyuki, 4,889,567, Cl. 148-12.00B.

Oku, Teruo; Todo, Eishiro; Kasahara, Chiyoshi; Nakamura, Katsuya; and Kayakiri, Hiroshi, to Fujisawa Pharmaceutical Co, Ltd. Benzothiadiazine compounds, and pharmaceutical composition comprising the same. 4,889,851, Cl. 514-223.200.

Okumura, Katsuya: *See*—
Miyoshi, Motosuke; and Okumura, Katsuya, 4,890,029, Cl. 313-7.000.

Okura, Zenichi: *See*—
Ogawa, Ryota; Toji, Shigeo; Yoshida, Kazushi; and Okura, Zenichi, 4,890,133, Cl. 354-402.000.

Okutani, Tetsuya: *See*—
Inoue, Keizo; Nomura, Hiroaki; and Okutani, Tetsuya, 4,889,953, Cl. 564-293.000.

Okuyama, Hideo: *See—*
Uda, Masahiro; Ohno, Satoru; and Okuyama, Hideo, 4,889,665, Cl. 264-10.000.

Olander, Jitka V.: *See—*
Schaumann, Jon P.; Olander, Jitka V.; Hrakas, Nicholaos K.; and Feder, Joseph, 4,889,922, Cl. 530-413.000.

Oldendorf, Christian; Maaz, Gunther; Nottbohm, Klaus; and Handwerk, Volker, to Sartorius GmbH. Drying balance with evaluation circuit for determining the end of the drying. 4,889,201, Cl. 177-25.140.

Oldendorf, Christian; Berg, Christoph; and Melcher, Franz-Josef, to Sartorius GmbH. Electronic balance with calibrating system. 4,890,246, Cl. 364-567.000.

Oleson, Richard A., to E. D. Bullard Company. Adjustable head band suspension system for use with hard hat shell. 4,888,831, Cl. 2-420.000.

Olin Corporation: *See—*
Butt, Sheldon H., 4,889,960, Cl. 174-52.400.

Oliveau, Olivier: *See—*
Elgue, Jean; Oliveau, Olivier; and Peytavy, Jean-Louis, 4,889,700, Cl. 423-220.000.

Oliver, Christopher J., to Cabletron, Inc. Visual display for communication network monitoring and troubleshooting. 4,890,102, Cl. 340-825.170.

Olsen, Roger A.: *See—*
Chernega, John G.; Martens, John A.; Olsen, Roger A.; and Cottingham, Auburn B., deceased, 4,889,895, Cl. 525-278.000.

Olson, Donald R.: *See—*
Zepernick, Dean E.; Olson, Donald R.; and Scott, Robert D., 4,889,153, Cl. 137-269.000.

Olson, Lynn T.: *See—*
Bales, Robert W.; and Olson, Lynn T., 4,890,237, Cl. 364-485.000.

Olson, Maynard V.; and Burke, David T., to Washington University. Large DNA cloning system based on yeast artificial chromosomes. 4,889,806, Cl. 435-172.300.

Olympus Optical Co., Ltd.: *See—*
Imai, Masaharu, 4,890,308, Cl. 377-79.000.
Kaneko, Nobuyuki; and Kato, Kiichi, 4,890,274, Cl. 369-45.000.
Ogiu, Hisao, 4,890,159, Cl. 358-98.000.
Ohta, Yoshinori, 4,889,826, Cl. 437-40.000.
Takeuchi, Toyoaki; and Ikeda, Yoshiaki, 4,890,273, Cl. 369-45.000.

Omron Tateisi Electronics Company: *See—*
Hashimoto, Hiroshi, 4,890,080, Cl. 335-17.000.

Omura, Yoshiaki: *See—*
Tanihara, Masao; Oka, Kiichiro; Yamada, Hideaki; Kobayashi, Akira; Nakashima, Toshihide; Omura, Yoshiaki; and Takakura, Koichi, 4,889,917, Cl. 530-324.000.

Ona, Isao; Naganawa, Tsutomu; Suzuki, Toshio; and Okawa, Tadashi, to Toray Silicone Company Limited. Composition for the surface treatment of rubber. 4,889,770, Cl. 428-447.000.

Onai, Kozo, to Tokyo Sen-I Kogyo Co., Ltd. Flexible electrically conductive sheet. 4,889,963, Cl. 174-129.00R.

Onda, Kenichi: *See—*
Miyazaki, Hideki; Onda, Kenichi; and Matsuda, Yasuo, 4,890,009, Cl. 307-270.000.

Ondria, John, to Marconoi Electronic Devices Limited. Quartz microstrip gunn oscillator. 4,890,074, Cl. 331-107.0SL.

Onishi, Masayoshi; and Fujimoto, Tadayuki, to Mitsubishi Denki Kabushiki Kaisha. Pneumatic actuator. 4,889,033, Cl. 91-6.000.

Onishi, Yasushi: *See—*
Tanaka, Kunio; and Onishi, Yasushi, 4,890,234, Cl. 364-474.230.

Ono, Hiroshi: *See—*
Tahara, Hideo; Makihara, Novuo; and Ono, Hiroshi, 4,889,507, Cl. 440-61.000.

Ono, Katsuyasu: *See—*
Yamamoto, Kazuo; and Ono, Katsuyasu, 4,889,363, Cl. 280-804.000.

Ono, Kozo: *See—*
Nagasawa, Kiyoshi; Ono, Kozo; Ogata, Kojiro; Murayama, Ken; and Hoshino, Yoshihiro, 4,888,878, Cl. 33-573.000.

Ono Pharmaceutical Co., Ltd.: *See—*
Kim, Soonih; Takeda, Kazuhisa; and Sasatani, Seiei, 4,889,723, Cl. 424-450.000.

Ono, Shuichi; Itagaki, Shuichi; and Yahagi, Masahiro, to TDK Corporation. Semiconductive ceramic composition. 4,889,837, Cl. 501-139.000.

Ono, Takuro; Aoyama, Noboru; and Morinaga, Kaoru, to Kabushiki Kaisha Toshiba. Optical disc player. 4,890,276, Cl. 369-77.200.

Ono, Yoshinobu: *See—*
Obata, Keiichi; Yoshida, Suguru; Saitoh, Masahiro; and Ono, Yoshinobu, 4,889,678, Cl. 264-313.000.

Onoda, Shigeo: *See—*
Banjo, Toshinobu; Murasawa, Yasuhiro; and Onoda, Shigeo, 4,890,197, Cl. 361-392.000.

Ootsuka, Hiroshi: *See—*
Fujino, Akihiko; Ootsuka, Hiroshi; and Izumi, Tatsuro, 4,890,134, Cl. 354-442.000.

Opitz, Norbert; and Lubbers, Dietrich W., to Max Planck Gesellschaft. Sensor for measuring physical parameters of concentration of particles. 4,889,690, Cl. 422-73.000.

Orii, Akira, to Janome Sewing Machine Industry Co., Ltd. Sewing machine with means for feeding a workpiece in two directions. 4,889,062, Cl. 112-318.000.

Orion Industries, Inc.: *See—*
Hendizen, Arne B.; Bowen, William A.; Evans, Michael W.; Hurley, John J.; and Leslie, Samuel A., 4,890,315, Cl. 379-59.000.

Ormsby, Mary E.; and Maltman, William R., to Pilkington plc. Manufacture of photochromic articles. 4,889,413, Cl. 350-354.000.

Ortega, Fernando M. Scenic variation systems. 4,888,892, Cl. 40-430.000.

Ortho Pharmaceutical Corporation: *See—*
Kligman, Albert M.; Mezick, James A.; and Capetola, Robert J., 4,889,847, Cl. 514-171.000.

Ortiz, Arturo L.: *See—*
Gannaway, Edwin L.; and Ortiz, Arturo L., 4,889,475, Cl. 417-350.000.

Osaki, Masanobu: *See—*
Nakaniwa, Shinpei; Otani, Seiichi; Hamada, Toru; Osaki, Masanobu; Hoshino, Yukio; and Tomisawa, Naoki, 4,889,100, Cl. 123-492.000.

Oschmann, Thomas R.: *See—*
Foster, Stephen R.; and Oschmann, Thomas R., 4,889,049, Cl. 100-171.000.

Oshima, Katsuhide; Murai, Toshiaki; Sakurai, Hitoshi; Igarashi, Shuji; Hanagata, Haruo; and Igarashi, Hidesato, to Dipsol Chemicals Co., Ltd. Electroplating bath and method for forming zinc-nickel alloy coating. 4,889,602, Cl. 204-38.100.

Oshima, Kazuo; and Iwasaki, Shizuo, to Bridgestone Corp. Pneumatic radial tires. 4,889,174, Cl. 152-529.000.

Oshima, Taku: *See—*
Fukayama, Yukio; Oshima, Taku; and Kawano, Shigeyoshi, 4,888,953, Cl. 60-657.000.

Oshima, Toshio: *See—*
Ishii, Kazuaki; Futatsugi, Toshiro; Oshima, Toshio; Fujii, Toshio; Yokoyama, Naoki; and Shibatomi, Akihiro, 4,889,831, Cl. 437-184.000.

Oster, Francis, to Buddy L Corporation. Drawing device having mobile stylus tracing lines on glass plate. 4,888,874, Cl. 33-18.100.

Ostlinning, Edgar: *See—*
Pielartzik, Harald; Ebert, Wolfgang; Meyer, Rolf-Volker; Traenckner, Hans-Joachim; and Ostlinning, Edgar, 4,889,911, Cl. 528-182.000.

Otaka, Tadashi: *See—*
Tsutsumi, Yoshitsugu; Ueda, Shinjiro; and Otaka, Tadashi, 4,889,995, Cl. 250-441.100.

Otani, Seiichi: *See—*
Nakaniwa, Shinpei; Otani, Seiichi; Hamada, Toru; Osaki, Masanobu; Hoshino, Yukio; and Tomisawa, Naoki, 4,889,100, Cl. 123-492.000.

Oten, Peter D. Snap action pressure relief valve with over pressure indicator. 4,889,151, Cl. 137-71.000.

Otsuka, Shoichi: *See—*
Kurakake, Mitsuo; Otsuka, Shoichi; and Muraoka, Yutaka, 4,890,100, Cl. 340-799.000.

Otsuki, Yasuo; and Nakamura, Yoshio, to Furukawa Electric Co., Ltd., The. Method of manufacturing the substrate of GaAs compound semiconductor. 4,889,493, Cl. 437-265.000.

Otto, Detlev: *See—*
Tsinberg, Mikhail; and Otto, Detlev, 4,890,283, Cl. 370-84.000.

Otto, Klaus: *See—*
Kippenberg, Horst; Moser, Thomas; and Otto, Klaus, 4,889,760, Cl. 428-192.000.

Oukami, Katutoshi: *See—*
Nakamura, Seishiro; Oukami, Katutoshi; and Asada, Masayuki, 4,889,833, Cl. 501-1.000.

Outboard Marine Corporation: *See—*
Anglin, Willie R., 4,889,311, Cl. 249-68.000.

Ovil, Yoel: *See—*
Schachner, Aryeh; and Ovil, Yoel, 4,889,112, Cl. 128-200.260.

Ovonic Imaging Systems, Inc.: *See—*
Cannella, Vincent D., 4,889,609, Cl. 204-298.000.

Owen, Lindsey D.: *See—*
Hird, John A.; Owen, Lindsey D.; and Rice, Michael R., 4,890,317, Cl. 379-132.000.

Owens, James W.: *See—*
Herron, Carlisle M.; Dean, Walter L.; Moore, Danny R.; Owens, James W.; and Schoggen, Howard L., 4,889,595, Cl. 162-157.600.

Oy Advanced Forest Automation Ab: *See—*
Tikka, Panu; and Virkola, Nils E., 4,889,593, Cl. 162-49.000.

Oy Wartsila AB: *See—*
Fundell, Yngve, 4,889,071, Cl. 118-126.000.

Ozaki, Tadayuki, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Vehicle suction system. 4,889,081, Cl. 123-52.00M.

Ozawa, Akira: *See—*
Okada, Eiichi; Ozawa, Akira; Kousaka, Tomomi; and Ohba, Hirokazu, 4,888,865, Cl. 29-568.000.

Pacific Bell: *See—*
Lubarsky, Daniel P., 4,890,279, Cl. 370-58.100.

Packard, Beverly; Edidin, Michael; and Komoriya, Akira, to Johns Hopkins University, The. Protein label and drug delivery system. 4,889,916, Cl. 525-54.100.

Paddock, Charles W., to Quaker Oats Company, The. Toy race car launcher. 4,889,513, Cl. 446-197.000.

Padovani, Francois A.: *See—*
Trenkler, George; Delagi, Richard G.; Padovani, Francois A.; and Winslow, Donald L., 4,890,083, Cl. 335-301.000.

Pages, Etienne: *See—*
Fell, Claude; Pages, Etienne; and Uhlmann, Dominique, 4,889,524, Cl. 494-12.000.

Pagniez, Guy: *See—*
Bordere, Serge; Pagniez, Guy; and Potin, Philippe, 4,889,910, Cl. 528-168.000.

Palazzotto, Michael C., to Minnesota Mining and Manufacturing Company. Ternary photoinitiator system for addition polymerization. 4,889,792, Cl. 430-281.000.

Palone, Thomas W.: *See—*
Long, Michael; Palone, Thomas W.; and Kemp, Paul, 4,889,269, Cl. 226-97.000.

Panavision, Inc.: *See—*
Saiki, Albert K., 4,889,424, Cl. 352-216.000.

Paquin, Jacques: *See—*
Chasseguet, Gustave; and Paquin, Jacques, 4,889,218, Cl. 192-106.200.

Park, Yong-Bo: *See—*
Kim, Byung-Youn; Park, Yong-Bo; and Jung, Tae-Sung, 4,890,051, Cl. 323-313.000.

Parke, Judith M.: *See—*
Dyson, Nicholas J.; Pashby, David P.; and Parke, Judith M., 4,889,606, Cl. 204-182.800.

Parker, Alan; and Davidson, Colin, to Dowell Schlumberger Incorporated. Process for retarding and controlling the formation of gels or precipitates derived from aluminium and corresponding compositions, plus the corresponding applications-in particular regarding oil wells. 4,889,563, Cl. 106-287.170.

Parker, Michael A. Electrician's level. 4,888,880, Cl. 33-645.000.

Parks, Harold G.; Piper, William W.; Possin, George E.; and Castleberry, Donald E., to General Electric Company. Process and structure for thin film transistor with aluminum contacts and nonaluminum metallization in liquid crystal displays. 4,889,411, Cl. 350-334.000.

Parks, Setella: *See—*
Terrell, Jamie B.; Terrell, Donna P.; and Parks, Setella, 4,889,187, Cl. 166-298.000.

Parrillo, Louis C., to Motorola, Inc. High/low doping profile for twin well process. 4,889,825, Cl. 437-34.000.

Parslow, Tristram G.; and Yamamoto, Keith R., to University of California, The Regents of the. Enhanced production of recombinant proteins in myeloma cells. 4,889,802, Cl. 435-69.100.

Parsons, Charles, Jr.; and Fang, Chen C., to Parsons Officials Supplies, Inc. Leg protector. 4,888,826, Cl. 2-22.000.

Parsons Officials Supplies, Inc.: *See—*
Parsons, Charles, Jr.; and Fang, Chen C., 4,888,826, Cl. 2-22.000.

Partlo, Loren G. Device for safely securing boards for martial arts activities. 4,889,334, Cl. 272-76.000.

Pasbrig, Max, to Lacrex Brevetti S.A. Apparatus for detachably clamping, tensioning and securing ropes, cables, wires, belts or the like. 4,889,320, Cl. 254-252.000.

Pashby, David P.: *See—*
Dyson, Nicholas J.; Pashby, David P.; and Parke, Judith M., 4,889,606, Cl. 204-182.800.

Pasztor, Karoly: *See—*
Balogh, Karoly; Dombay, Zsolt; Fodor, Karoly; Grega nee Toth, Erzebet; Lorik, Erno ; Magyar nee Tomorkenyi, Magdolna; Nagy, Jozsef; Pasztor, Karoly; Santha, Pal; Tarpai, Gyula; Toth, Istvan; and Urszin nee Simon, Eszter, 4,889,944, Cl. 558-171.000.

Patel, Sanjay R.: *See—*
Smith, Daniel J.; and Patel, Sanjay R., 4,889,530, Cl. 604-304.000.

Patterson, Roosevelt. Dental mixer apparatus. 4,889,432, Cl. 366-139.000.

Paul Wurth S.A.: *See—*
Legille, Edouard; and Lonardi, Emile, 4,889,008, Cl. 74-520.000.
Mailliet, Pierre; Lonardi, Emile; and Cimenti, Giovanni, 4,889,004, Cl. 74-479.000.

Paulsson, Lars, to Asea Brown Boveri AB. Series capacitor equipment. 4,890,180, Cl. 361-16.000.

Pavlidis, George. Method and means for detecting dyslexia. 4,889,422, Cl. 351-210.000.

Payne, Paul E.: *See—*
Nuckolls, Joe A.; and Payne, Paul E., 4,890,041, Cl. 315-225.000.

PCR, Inc.: *See—*
Wilson, Michael E., 4,889,747, Cl. 427-221.000.

Pea, Kevin I.; Tenniswood, David M.; and Loeck, Steven M., to Gleason Reel Corp. Rotating retractable cam limit switch. 4,889,964, Cl. 200-31.00R.

Pearce, Timothy H. B., to General Electric Company, p.l.c., The. Analogue-to-digital converter. 4,890,107, Cl. 341-156.000.

Pease Industries, Inc.: *See—*
Green, F. Richard; and Kreimer, Charles C., 4,888,918, Cl. 49-501.000.

Peavey Electronics Corporation: *See—*
Brown, James W., Sr.; and Sondermeyer, Jack C., 4,890,331, Cl. 381-120.000.

Pecht, Glenn G.: *See—*
Amundson, Donald E.; Hamaker, Jon B.; Pecht, Glenn G.; and Sedy, Josef, 4,889,348, Cl. 277-1.000.

Peck, John H., to McDonnell Douglas Helicopter Company. Firearm loading mechanism for an automated cannon. 4,889,031, Cl. 89-33.200.

Pedersen, Finn S.: *See—*
Koffsky, Robert M.; and Pedersen, Finn S., 4,889,290, Cl. 241-36.000.

Pellet, Regis J.: *See—*
Miller, James G.; Pellet, Regis J.; Shamshoum, Edwar S.; and Rabo, Jule A., 4,889,616, Cl. 208-114.000.

Pellin, Michael J.: *See—*
Gruen, Dieter M.; Young, Charles E.; and Pellin, Michael J., 4,889,987, Cl. 250-282.000.

Pelloux-Gervais, Pierre; Zapata, Richard; and Bres, Michel, to l'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Hood for protecting against smoke and hypoxia. 4,889,113, Cl. 128-201.250.

Pelski, Ronald E. Mattress support. 4,888,838, Cl. 5-207.000.

Penney, Bruce J.: *See—*
Baker, Daniel G.; Cooper, William J.; and Penney, Bruce J., 4,890,158, Cl. 358-10.000.

Perfection Spring & Stamping Corp.: *See—*
Seyler, Peter G., 4,889,327, Cl. 267-168.000.

Perkins, Gilbert R.: *See—*
Heckaman, Douglas E.; Perkins, Gilbert R.; and Higman, Roger H., 4,890,195, Cl. 361-386.000.

Perma Power Electronics, Inc.: *See—*
Schornack, Louis W., 4,890,002, Cl. 307-66.000.
Schornack, Louis W., 4,890,005, Cl. 307-87.000.

Permanent Label Corporation: *See—*
Meador, Neil A., 4,889,050, Cl. 101-38.100.

Permelec Electrode Ltd.: *See—*
Shimamune, Takayuki; and Hosonuma, Masashi, 4,889,685, Cl. 419-9.000.

Perry, John C. Parking stand for supporting the tongue of a parked trailer. 4,889,357, Cl. 280-475.000.

Perry, Mordechai; Kotraro, Reuven; Linder, Charles; and Aviv, Gershon, to Aligena, AG. High flux RO/UF membranes. 4,889,636, Cl. 210-651.000.

Persson, Tage, to Asea Aktiebolag. Rotor for a turbo-generator. 4,890,028, Cl. 310-261.000.

Pestonji, Hoshang R.: *See—*
Heath, Chester A.; Jackson, Kevin M.; Judice, Darryl E.; and Pestonji, Hoshang R., 4,890,219, Cl. 364-200.000.

Peters, Jens; and Becker, Ludwig, to Deutsches Electronen-Synchrotron DESY. Method and apparatus for error correction of phase measurement signals. 4,890,056, Cl. 324-83.00D.

Peterson, Alex, Jr.: *See—*
Durairaj, Bojayan; Peterson, Alex, Jr.; and Salee, Gideon, 4,889,891, Cl. 525-139.000.

Peterson, Arnold N.; and Sprague, Larry A., to Peterson Pacific Corporation. Combination log debarker-chipper. 4,889,169, Cl. 144-208.00J.

Peterson Pacific Corporation: *See—*
Peterson, Arnold N.; and Sprague, Larry A., 4,889,169, Cl. 144-208.00J.

Petito, Michael D.; and Redes, Peter, to Raytheon Company. Time multiplexed radar link. 4,890,112, Cl. 342-58.000.

Petroleo Brasileiro S.A. - Petrobras: *See—*
de Andrade Bruning, Inai M. R., 4,889,813, Cl. 436-60.000.

Pettit, Paul H., Jr.: *See—*
Kerr, Paul R.; Pettit, Paul H., Jr.; and Ewing, William S., 4,889,890, Cl. 525-113.000.

Peviani, Thomas P. Quick releasable vice-grip pliers. 4,889,022, Cl. 81-368.000.

Peytavy, Jean-Louis: *See—*
Elgue, Jean; Oliveau, Olivier; and Peytavy, Jean-Louis, 4,889,700, Cl. 423-220.000.

Pfenninger, Heinz, to Ciba-Geigy Corporation. Process for treating aqueous fluids containing organic compounds and salts of polyvalent inorganic acids. 4,889,633, Cl. 210-639.000.

Pfister, Jurg R.; Davis, Roman; and Lee, Chi-Ho, to Syntex (U.S.A.) Inc. Arylsulfonyl dihydropyridine derivatives. 4,889,866, Cl. 514-347.000.

Pfizer Hospital Products: *See—*
Millar, Huntley D., 4,889,128, Cl. 128-662.060.

Pfizer Hospital Products Group, Inc.: *See—*
D'Antonio, Nicholas F.; and D'Antonio, Nicholas J., 4,889,531, Cl. 604-319.000.

Pfleiderer, Ernst: *See—*
Christner, Juergen; Pfleiderer, Ernst; and Taeger, Tilmann, 4,889,811, Cl. 435-265.000.

Pflug, Robert F.: *See—*
Glickman, Joel I.; and Pflug, Robert F., 4,889,304, Cl. 248-222.100.

Phalangas, Charalambos J.; and Cleary, Thomas P., to ICI Americas Inc. Ultraviolet radiation absorbing naphthalenylidene compositions. 4,889,947, Cl. 560-119.000.

Phase Devices Limited: *See—*
Radcliffe, Christopher J., 4,890,078, Cl. 333-134.000.

Philip Morris Incorporated: *See—*
Banyasz, Joseph L.; Burton, Aubrey T.; LaRoy, Bernard C.; and Lowitz, David A., 4,890,053, Cl. 324-58.50A.

Philipp, Matthias: *See—*
Beyer, Hans-Ernst; Bonitz, Jorg; Entenmann, Robert; Forster, Siegmar; Knab, Rochus; Kunzel, Walter; Kugler, Wolfgang; Mahlberg, Alfred; Miller, Bernhard; Philipp, Matthias; Rohde, Siegfried; Unland, Stefan; Viess, Walter; Winter, Herbert; and Zimmermann, Jurgen, 4,889,094, Cl. 123-414.000.

Philippson, Walter M.; Brennan, Robert J.; and Meighen, Terrence, to Stewart Stamping Corporation. Shielded plug and jack connector. 4,889,503, Cl. 439-610.000.

Phillips, Paul M.: *See—*
Cadwell, Gilbert C.; and Phillips, Paul M., 4,889,276, Cl. 228-265.000.

Phillips Petroleum Company: *See—*
Drake, Charles A., 4,889,840, Cl. 502-255.000.

Phillips, Richard B.: *See—*
Lutomski, Kathryn A.; Roush, David M.; and Phillips, Richard B., 4,889,867, Cl. 514-365.000.

Phillips, Robert B.; and Stonestreet, Paul R., to VG Instruments Group Limited. Bakeable vacuum systems. 4,889,319, Cl. 251-368.000.

Phospho Energetics, Inc.: *See*—
Taube, John C., 4,889,116, Cl. 128-204.230.

Piatt, John A. Harness for swim fins. 4,889,510, Cl. 441-63.000.

Pickenhagen, Wilhelm; and Velluz, Alain, to Firmenich S.A. Furanic esters and their utilization as flavor ingredients. 4,889,735, Cl. 426-536.000.

Pielartzik, Harald; Ebert, Wolfgang; Meyer, Rolf-Volker; Traenckner, Hans-Joachim; and Ostlinning, Edgar, to Bayer Aktiengesellschaft. Process for the production of fully aromatic, thermotropic polyesters and polyester carbonates. 4,889,911, Cl. 528-182.000.

Piepenbreier, Bernhard: *See*—
Nerowski, Georg; Piepenbreier, Bernhard; and Toelle, Hans-Juergen, 4,890,181, Cl. 361-18.000.

Pietruszkiewicz, Adolph: *See*—
Tolman, Richard L.; Wagner, Arthur F.; Baldwin, John J.; and Pietruszkiewicz, Adolph, 4,889,856, Cl. 514-254.000.

Pilkington plc: *See*—
Ormsby, Mary E.; and Maltman, William R., 4,889,413, Cl. 350-354.000.

Pillifant, Albert, Jr. Screen printed clamp-on automotive sun-filter assembly. 4,889,380, Cl. 296-97.600.

Pinck, Peter: *See*—
Lorenzen, Heinz C.; Pinck, Peter; and Lange, Norbert, 4,889,140, Cl. 131-281.000.

Pine Instrument Company: *See*—
Eickmann, Guenter, 4,889,608, Cl. 204-212.000.

Pinson, George T., to Boeing Company, The. Thermal resistivity coatings for optical fibers. 4,889,400, Cl. 350-96.300.

Pinto, Akiva; Lucassen, Guenter; and Schmidt, Reinhard, to Hergeth Hollingsworth GmbH. Apparatus for removing fiber material accumulations, in particular from bales of spinning material. 4,888,857, Cl. 19-80.00R.

Pioneer Electronic Corporation: *See*—
Ando, Hitoshi; Kashiwazaki, Takashi; Hosoi, Masayuki; and Fukushima, Atsuhiko, 4,890,233, Cl. 364-457.000.
Inohana, Haruyuki; Takaoka, Saburo; and Takada, Hideaki, 4,890,170, Cl. 360-65.000.
Nagao, Tatsuro, 4,890,171, Cl. 360-73.050.
Tateishi, Kiyoshi, 4,890,277, Cl. 369-219.000.
Yokozawa, Seiichi, 4,890,173, Cl. 360-77.150.

Piper, William W.: *See*—
Parks, Harold G.; Piper, William W.; Possin, George E.; and Castleberry, Donald E., 4,889,411, Cl. 350-334.000.

Pitassi, Vincent E.; and Fernandez, Angel, to Pitassi, Vincent E. Torque converter and assembly utilizing same. 4,889,013, Cl. 74-752.00F.

Pitney Bowes Inc.: *See*—
Auerbach, David R., 4,888,938, Cl. 53-569.000.

Plastics Engineering Company: *See*—
Liang, Yeon F., 4,889,898, Cl. 525-67.000.

Plastoform GmbH & Co. KG: *See*—
Hauff, Werner, 4,889,298, Cl. 248-56.000.

Plessey Overseas Limited: *See*—
Galpin, Robert K. P., 4,890,298, Cl. 375-14.000.

Pluess Staufer AG: *See*—
Seinera, Henry; Luberne, Patricia; Stock, Claude; and Trouve, Patrick, 4,889,879, Cl. 524-13.000.

Plzak, Timothy G.: *See*—
Jabusch, John D.; Kovacs, Linda A.; Plzak, Timothy G.; and Richardson, Robert R., 4,890,253, Cl. 364-736.500.

Poettgen, Robert J., to O. R. Concepts, Inc. Reflective surgical drape. 4,889,135, Cl. 128-849.000.

Pohlmann, Juergen L. W.; Honey, Richard C.; and Guagliardo, John L., to United States of America, Army. Optical radiation limiter. 4,890,075, Cl. 330-4.300.

Pohlus, Gunther. Slideable outrigger. 4,889,509, Cl. 440-105.000.

Polefka, Thomas G.: *See*—
Gaffar, Abdul; and Polefka, Thomas G., 4,889,713, Cl. 424-52.000.

Poliack, Steven H.: *See*—
Hoffman, Brian D.; and Pollack, Steven H., 4,890,241, Cl. 364-513.000.

Pollmann, Kurt: *See*—
Klein, Klaus; Pollmann, Kurt; Schettler, Helmut; Schulz, Uwe; Wagner, Otto M.; and Zuehlke, Rainer, 4,890,238, Cl. 364-491.000.

Polyplastics Co., Ltd.: *See*—
Wada, Mitsuo; Kanoe, Toshio; and Ishikawa, Takayuki, 4,889,886, Cl. 524-449.000.

Pompa, Gerard A.: *See*—
Jaafar, Hamedo A.; Katzor, Karl A.; Rethage, Wilbert B.; Pompa, Gerard A.; Dailey, George F.; and Guenther, Paul, 4,889,000, Cl. 73-865.800.

Porsche AG: *See*—
Burst, Hermann; Durm, Jurgen; Kretschmer, Helmut; and Schuhmann, Georg, 4,889,382, Cl. 296-180.500.

Porter, Philip: *See*—
Davis, Paul J.; and Porter, Philip, 4,889,816, Cl. 436-518.000.

Porvair Limited: *See*—
Kleinerman, George J.; and Woodcock, John M., 4,888,829, Cl. 2-167.000.

Possin, George E.: *See*—
Parks, Harold G.; Piper, William W.; Possin, George E.; and Castleberry, Donald E., 4,889,411, Cl. 350-334.000.

Possis, Zinon C. Automatic pet feeder. 4,889,077, Cl. 119-51.110.

Post, Russell H., Jr. Cupola Mount. 4,888,923, Cl. 52-200.000.

Post, Steven L.: *See*—
Drye, James E.; and Post, Steven L., 4,890,156, Cl. 357-74.000.

Potin, Philippe: *See*—
Bordere, Serge; Pagniez, Guy; and Potin, Philippe, 4,889,910, Cl. 528-168.000.

Potter, William R.: *See*—
Dougherty, Thomas J.; Potter, William R.; and Weishaupt, Kenneth R., 4,889,129, Cl. 128-664.000.

Pouyer, Joseph E. Method and apparatus for construction of artificial roads. 4,889,444, Cl. 404-34.000.

Powell, Thomas P. Tamper-proof odometer. 4,889,976, Cl. 235-96.000.

Powers, John R.; Stipp, Gordon K.; Strobel, Rudolf G. K.; and Tsai, Chee-Hway, to Procter & Gamble Company, The. Method for obtaining commercial feed juices having a more hand-squeezed character. 4,889,739, Cl. 426-599.000.

PPG Industries, Inc.: *See*—
Kerr, Paul R.; Pettit, Paul H., Jr.; and Ewing, William S., 4,889,890, Cl. 525-113.000.

Pradom Limited: *See*—
Berger, Michel, 4,889,088, Cl. 123-188.00B.

Pratt, William C., to Micro Chemical, Inc. Programmable apparatus and method for delivering microingredient feed additives to animals by weight. 4,889,433, Cl. 366-141.000.

Prein, Franz; Wiegand, Jurgen; Frey, Peter; and Klink, Norbert, to Eltro GmbH; and Doduco KG. Discharge electrode with microstructure surface. 4,890,035, Cl. 313-633.000.

Premier Industrial Corporation: *See*—
Hageman, David C., 4,889,457, Cl. 411-10.000.

Prezas, Dimitrios P.; and Thomson, David L., to American Telephone and Telegraph Company; and AT&T Bell Laboratories. Voice synthesis utilizing multi-level filter excitation. 4,890,328, Cl. 381-38.000.

Price, Judith E., to Beatrice/Hunt-Wesson, Inc. Pourable shortening and process for its preparation. 4,889,740, Cl. 426-606.000.

Priceman, Seymour, to Barson Corporation. Refractory metal composite coated article. 4,889,776, Cl. 428-629.000.

Prime Technology, Inc.: *See*—
Sardella, Louis M., 4,889,331, Cl. 271-11.000.

Princeton University, The Trustees of: *See*—
Taylor, Edward C.; and Shih, Chuan, 4,889,859, Cl. 514-258.000.

Prior, William C.; Ellis, III: George S.; and Crozier, David W., to Kinetico, Inc. Brining system. 4,889,623, Cl. 210-190.000.

Pritchard, Kelvin R. D. Sinker. 4,888,911, Cl. 43-44.960.

Pritchard, Kevin M. Disposable razor assembly with detachable packet containing shaving-associated material. 4,888,868, Cl. 30-41.000.

Process Evaluation and Development Corporation: *See*—
Villavicencio, Eduardo J.; and Gomez-Estevez, Camilo, 4,889,591, Cl. 162-20.000.

Procter & Gamble Cellulose Company, The: *See*—
Bourbon, Robert M.; and Ryan, John J., Jr., 4,889,597, Cl. 162-157.600.
Herron, Carlisle M.; Dean, Walter L.; Moore, Danny R.; Owens, James W.; and Schoggen, Howard L., 4,889,595, Cl. 162-157.600.

Procter & Gamble Company, The: *See*—
Batchelor, Jay A., 4,889,238, Cl. 206-535.000.
Powers, John R.; Stipp, Gordon K.; Strobel, Rudolf G. K.; and Tsai, Chee-Hway, 4,889,739, Cl. 426-599.000.
Roberts, Bruce A.; and Burkes, Alice L., 4,889,730, Cl. 426-102.000.
Royce, Ralph R.; Kremer, Bernard K.; and Bisio, Paul D., 4,889,643, Cl. 252-8.800.

Product Concepts, Inc.: *See*—
Wagner, Kenneth A., 4,889,322, Cl. 256-36.000.

Product Resources International, Inc.: *See*—
Mackles, Leonard; and Chavkin, Leonard, 4,889,709, Cl. 424-45.000.

Production Control Units, Inc.: *See*—
Weaver, Kim A.; Jones, James M.; and Thibault, Joseph A., 4,889,149, Cl. 137-1.000.

Pronto Auto Repair Dealerships Inc.: *See*—
Rouse, Jack, 4,888,972, Cl. 72-186.000.

Proter & Gamble Cellulose Company, The: *See*—
Schoggen, Howard L.; Cook, Jeffrey T.; and Bourbon, Robert M., 4,889,596, Cl. 162-157.600.

Proto, Antonio: *See*—
Canova, Luciano; Giannini, Umberto; Albizzati, Enrico; Borghi, Italo; and Proto, Antonio, 4,889,896, Cl. 525-375.000.

Protocol Systems, Inc.: *See*—
Nelson, Craig H.; Dorsett, Thomas J.; and Davis, Charles L., 4,889,133, Cl. 128-681.000.

Provence, Albert M., Jr. Self righting road marker. 4,889,067, Cl. 116-63.00C.

Pryor, James W.; Raker, Mark L.; Sensabaugh, Andrew J., Jr.; and Hauser, Henry A., to R. J. Reynolds Tobacco Company. Cigarette rods and filters containing strands provided from sheet-like materials. 4,889,143, Cl. 131-331.000.

Przewalski, Zygmunt J., to M & S Engineering & Manufacturing Co., Inc. Portable soil decontamination kiln. 4,889,484, Cl. 432-103.000.

Psicom Sports Incorporated: *See*—
Rudnick, Paul J., 4,890,229, Cl. 364-410.000.

Pusch, Hermann; Zeller, Siegfried; Millionis, Konstantin; and Kresl, Hans, to Voest-Alpine Aktiengesellschaft. Mill arrangement with primary gas mixing means. 4,889,323, Cl. 266-142.000.

Putnam, Allen L. Quick release adjustable tension strap. 4,888,830, Cl. 2-327.000.

Quaid, Joel, to Medical Products Development Inc. Method for making open-cell, silicone-elastomer medical implant. 4,889,744, Cl. 427-2.000.

Quaker Oats Company, The: *See*—
Paddock, Charles W., 4,889,513, Cl. 446-197.000.

R. J. Reynolds Tobacco Company: *See*—
Pryor, James W.; Raker, Mark L.; Sensabaugh, Andrew J., Jr.; and Hauser, Henry A., 4,889,143, Cl. 131-331.000.
R. T. Vanderbilt Company, Inc.: *See*—
Rowan, Eugene V.; Karol, Thomas J.; and Farmer, Homer H., 4,889,647, Cl. 252-42.700.
Rabbani, Elazar, to Enzo Biochem, Inc. Heterologous system for the detection of chemically labeled DNA and other biological materials providing a receptor or target moiety thereon. 4,889,798, Cl. 435-6.000.
Rabbit Systems, Inc.: *See*—
Goldstein, Steven G., 4,890,265, Cl. 367-94.000.
Rabinzohn, Patrick: *See*—
Selle, Daniel; Boissenot, Philippe; and Rabinzohn, Patrick, 4,889,824, Cl. 437-31.000.
Rabo, Jule A.: *See*—
Miller, James G.; Pellet, Regis J.; Shamshoum, Edwar S.; and Rabo, Jule A., 4,889,616, Cl. 208-114.000.
Racal Communications Equipment Limited: *See*—
Andrews, Christopher J., 4,890,300, Cl. 375-60.000.
Racal-Guardata Limited: *See*—
Beker, Henry J.; Halliden, Paul W.; and Friend, John M. K., 4,890,323, Cl. 380-25.000.
Radcliffe, Christopher J., to Phase Devices Limited. Diplexer. 4,890,078, Cl. 333-134.000.
Rahman, Turhan F.: *See*—
Sinha, Pradeep; and Rahman, Turhan F., 4,890,242, Cl. 364-518.000.
Railway Engineering Associates, Inc.: *See*—
List, Harold A., 4,889,054, Cl. 105-167.000.
Railway Track-Work Company: *See*—
Ramm, Edmund C.; and Nogan, John J., II, 4,888,845, Cl. 15-182.000.
RainWise, Inc.: *See*—
Baer, John S.; and Vietti, Michael A., 4,888,986, Cl. 73-188.000.
Rak, Thomas A.; and Whitaker, T. Mark, to Movats Incorporated. DC motor operated valve remote monitoring system. 4,888,996, Cl. 73-862.190.
Raker, Mark L.: *See*—
Pryor, James W.; Raker, Mark L.; Sensabaugh, Andrew J., Jr.; and Hauser, Henry A., 4,889,143, Cl. 131-331.000.
Ram-Line, Inc.: *See*—
Chesnut, M. Gaines; and Wood, W. Lawrence, 4,888,899, Cl. 42-50.000.
Ramet, Serge, to SGA-Thomson Microelectronics S.A. Sequential operation differential current amplifier. 4,890,014, Cl. 307-355.000.
Ramm, Edmund C.; and Nogan, John J., II, to Railway Track-Work Company. Sweeping apparatus for railway ballast regulators. 4,888,845, Cl. 15-182.000.
Ramsey, Raymond C.; and Thurston, Marlin O., to Neoprobe Corporation. Gamma radiation detector with enhanced signal treatment. 4,889,991, Cl. 250-336.100.
Ramsey, Thomas H., to Texas Instruments Incorporated. Gas mixture for use in control and formation of ball bonds. 4,889,274, Cl. 228-179.000.
Ranken, Paul F., to Ethyl Corporation. Preparation of (hydrocarbylthio)aromatic amines. 4,889,955, Cl. 564-440.000.
Rappaport, Ruth, to American Home Products. Method of enchancing t-PA and SCU-PA production. 4,889,808, Cl. 435-240.100.
Rasetti, Vittorio: *See*—
Buhlmayer, Peter; Stanton, James L.; Fuhrer, Walter; Goschke, Richard; Rasetti, Vittorio; and Rueger, Heinrich, 4,889,869, Cl. 514-400.000.
Rasmussen, Stig: *See*—
Moller, Jens T.; Jacobsen, Niels; Nielsen, Kirsten K.; and Rasmussen, Stig, 4,889,698, Cl. 423-210.000.
Rassel, William van: *See*—
Seth-Smith, Nigel; Bates, Cameron; Lim, Samson; Rassel, William van; Yoneda, Robert; and Lucas, Keith, 4,890,319, Cl. 380-5.000.
Rastrelli, Edmund C.: *See*—
Kindt-Larsen, Ture; Heaton, John C.; and Rastrelli, Edmund C., 4,889,664, Cl. 264-2.600.
Ratcliff, Perry A. Method for retarding dental plaque by killing streptococcus sanguis. 4,889,714, Cl. 424-53.000.
Rauh, R. David; and Goldner, Ronald B., to EIC Laboratories, Inc. Light modulating device. 4,889,414, Cl. 350-357.000.
Rauscher, Elizabeth A.; and Van Bise, William L., to Magtech Laboratories, Inc. Non-invasive method and apparatus for modulating brain signals through an external magnetic or electric field to reduce pain. 4,889,526, Cl. 600-14.000.
Raychem Corporation: *See*—
Connolly, Joseph; Holt, Neil L.; Richardson, Anthony R. W.; and Siedenburg, Jay, 4,889,506, Cl. 439-874.000.
Covington, Anne E.; Hunter, Thomas A.; and Dawes, Keith, 4,889,717, Cl. 428-304.400.
Zucker, Joseph; Shen, Nelson M.; Campbell, Bruce D.; Rodhe, Peder; and Call, Tom, 4,889,403, Cl. 350-96.150.
Raychem Limited: *See*—
Sweet, Martin, 4,890,182, Cl. 361-56.000.
Raytheon Company: *See*—
Bram, Jeffry M., 4,890,218, Cl. 364-200.000.
Petito, Michael D.; and Redes, Peter, 4,890,112, Cl. 342-58.000.
RCA Licensing Corporation: *See*—
Clayburn, Randall C., 4,890,044, Cl. 315-411.000.
McNeely, David L.; and Fling, Russell T., 4,890,162, Cl. 358-138.000.
Rea, Philip L.; and Bagshaw, Stanley R. Tile mounting system. 4,888,928, Cl. 52-387.000.
Record, David W.: *See*—
Dave, Jayant C.; Record, David W.; Nespor, Jill M.; and Hook, Jeffrey S., 4,889,726, Cl. 426-3.000.
Dave, Jayant C.; Record, David W.; Nespor, Jill M.; and Hook, Jeffrey S., 4,889,727, Cl. 426-3.000.
Redes, Peter: *See*—
Petito, Michael D.; and Redes, Peter, 4,890,112, Cl. 342-58.000.
Redmon, David T.: *See*—
Schmit, Frank L.; Redmon, David T.; and Ewing, Lloyd, 4,889,620, Cl. 210-137.000.
Rees, Richard: *See*—
Rowson, Graham P.; Head, John C.; Westermann, Jurgen; Kruger, Martin; Arndt, Friedrich; and Rees, Richard, 4,889,553, Cl. 71-92.000.
Reger, Steven I.; Neth, Donald C.; and McGovern, Thomas F., to Cleveland Clinic Foundation, The. Computer aided prescription of specialized seats for wheelchairs or other body supports. 4,890,235, Cl. 364-468.000.
Reiger, Ralph E. Method and fabric container for controlling root growth. 4,888,914, Cl. 47-78.000.
Reilly, Kenneth T.; Douglas, Alan D.; and Hoffman, Henry E., to GTE Products Corporation. Process for producing tungstosilicic acid. 4,889,703, Cl. 423-326.000.
Reina, David: *See*—
Auer, Robert T.; and Reina, David, 4,889,515, Cl. 446-428.000.
Auer, Robert T.; and Reina, David, 4,889,516, Cl. 446-462.000.
Reinehr, Dieter: *See*—
Hefti, Heinz; Artz, Klaus; Weber, Kurt; Burdeska, Kurt; and Reinehr, Dieter, 4,889,655, Cl. 252-301.220.
Reinhardt, Alexander-Maria; and Reinhardt, Erich K., to Schumacher'sche Fabrik GmbH & Co. KG. Filter body. 4,889,630, Cl. 210-490.000.
Reinhardt, Erich K.: *See*—
Reinhardt, Alexander-Maria; and Reinhardt, Erich K., 4,889,630, Cl. 210-490.000.
Reinhardt, Victor S., to Hughes Aircraft Company. Method and apparatus for reducing aliasing in signal processing. 4,890,248, Cl. 364-574.000.
Reinhart, Franz K., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Electro-optic polarization modulation in multi-electrode waveguides. 4,889,402, Cl. 350-96.140.
Reinhold, Herbert E., Jr.: *See*—
Greenwold, Douglas J.; and Reinhold, Herbert E., Jr., 4,889,134, Cl. 128-696.000.
Rembold, Helmut, to Robert Bosch GmbH. Valve control device with magnetic valve for internal combustion engines. 4,889,084, Cl. 123-90.120.
Republic Tool & Manufacturing Corp.: *See*—
Havlovitz, Paul M., 4,889,360, Cl. 280-655.100.
Research and Development Institute, Inc. at Montana State University: *See*—
El-Megeed, Mohamed E. A.; and Sands, David C., 4,889,810, Cl. 435-252.900.
Restle , Serge: *See*—
Shroot, Braham; Lang, Gerard; Maignan, Jean; Restle , Serge; Hensby, Christopher; and Colin, Michel, 4,889,865, Cl. 514-332.000.
Rethage, Wilbert B.: *See*—
Jaafar, Hamedo A.; Katzor, Karl A.; Rethage, Wilbert B.; Pompa, Gerard A.; Dailey, George F.; and Guenther, Paul, 4,889,000, Cl. 73-865.800.
Revel, Michel; Rubinstein, Menachem; and Mory, Yvez, to Yeda Research & Development Co., Ltd. Production of interferon gamma. 4,889,803, Cl. 435-69.510.
Reynolds, Keith Y.: *See*—
Johnson, Brion; Kesti, Michael R.; and Reynolds, Keith Y., 4,890,163, Cl. 358-181.000.
Rheem Manufacturing Company: *See*—
Chmielewski, Konrad G., 4,888,957, Cl. 62-84.000.
Rheinmetall GmbH: *See*—
Grosswendt, Werner; and Unterstein, Klaus, 4,889,030, Cl. 89-1.140.
Grosswendt, Werner; Unterstein, Klaus; and Simon, Walter, 4,889,053, Cl. 102-348.000.
Rhoades, George D.: *See*—
Tyree, Lewis, Jr.; Gyger, Roger F.; and Rhoades, George D., 4,888,955, Cl. 62-47.100.
Rhone-Poulenc Chimie: *See*—
Grenouillet, Pierre; Neibecker, Denis; and Tkatchenko, Igor, 4,889,949, Cl. 560-202.000.
Rhone-Poulenc Chimie de Base: *See*—
Besson, Bernard; Kalck, Philippe; and Thorez, Alain, 4,889,957, Cl. 568-454.000.
Rhone-Poulenc Inc.: *See*—
Gradeff, Peter S.; and Davison, John F., 4,889,771, Cl. 428-541.000.
Ricard, Sylvio. Tractor-controlled hammer assembly. 4,889,192, Cl. 173-22.000.
Rice, Donald D.; Hawkins, James C.; and Hall, Stanley D., to Fisher Controls International, Inc. Pressure/flow compensated direct acting pressure regulator. 4,889,158, Cl. 137-484.400.
Rice, Michael R.: *See*—
Hird, John A.; Owen, Lindsey D.; and Rice, Michael R., 4,890,317, Cl. 379-132.000.

Richardson, Anthony R. W.: *See—*
Connolly, Joseph; Holt, Neil L.; Richardson, Anthony R. W.; and Siedenburg, Jay, 4,889,506, Cl. 439-874.000.
Richardson, Robert R.: *See—*
Jabusch, John D.; Kovacs, Linda A.; Pizak, Timothy G.; and Richardson, Robert R., 4,890,253, Cl. 364-736.500.
Riches, Arthur J., to Amphenol Corporation. Shielded electrical connector. 4,889,497, Cl. 439-76.000.
Richmond Screw Anchor Co., Inc.: *See—*
Lancelot, Harry B., 4,888,922, Cl. 52-124.200.
Ricoh Company, Ltd.: *See—*
Kameda, Masahiro; Kamei, Yojiro; and Kurihara, Kenichi, 4,890,151, Cl. 357-65.000.
Sasaki, Eiichi; Mori, Takashi; and Watanabe, Tetsuo, 4,890,120, Cl. 346-76.0PH.
Rieger, Hansjorg: *See—*
Zeiser, Peter; Kaiser, Helmut; and Rieger, Hansjorg, 4,889,172, Cl. 152-226.000.
Rietsch, Donald R., to Ford Motor Company. Manual transmission gearset brake for synchronized engagement of a sliding gear. 4,889,003, Cl. 74-339.000.
Rigby, William R.; Furneaux, Robin C.; and Thomas, Anthony T., to Alcan International Limited. Anodic aluminium oxide membranes. 4,889,631, Cl. 210-493.100.
Rikuna, Kenji: *See—*
Hara, Kazuya; and Rikuna, Kenji, 4,889,980, Cl. 235-488.000.
Rinke, Richard A. Pop can transport device. 4,889,245, Cl. 211-49.100.
Rinkewich, Isaac. High-strength panel structure. 4,889,758, Cl. 428-178.000.
Rio Linda Chemical Company, Inc.: *See—*
Mason, John Y.; Hicks, Bruce W.; and English, Donald C., 4,889,654, Cl. 252-100.000.
Rise, James D.: *See—*
Titterington, Donald R.; Anderson, Jeffrey J.; Rise, James D.; and Jaeger, Wayne, 4,889,761, Cl. 428-195.000.
Ritter, Lawrence; and Lawter, James R., to American Cyanamid Company. Vehicle for topical application of pharmaceuticals. 4,889,845, Cl. 514-63.000.
Ritz, Josef: *See—*
Fuchs, Hugo; Ritz, Josef; Thomas, Erwin; and Weiss, Franz-Josef, 4,889,704, Cl. 423-387.000.
Riverside Research Institute: *See—*
Elbaum, Marek; Gutkowicz-Krusin, Dina; and Nowakowski, Jerzy, 4,889,398, Cl. 350-3.670.
RMT, Inc.: *See—*
Stanforth, Robert R., 4,889,640, Cl. 210-751.000.
Robert Bosch GmbH: *See—*
Beyer, Hans-Ernst; Bonitz, Jorg; Entenmann, Robert; Forster, Siegmar; Knab, Rochus; Kunzel, Walter; Kugler, Wolfgang; Mahlberg, Alfred; Miller, Bernhard; Philipp, Matthias; Rohde, Siegfried; Unland, Stefan; Viess, Walter; Winter, Herbert; and Zimmermann, Jurgen, 4,889,094, Cl. 123-414.000.
Brunel, Andre, 4,889,096, Cl. 123-450.000.
Rembold, Helmut, 4,889,084, Cl. 123-90.120.
Zirps, Wilhelm, 4,888,952, Cl. 60-589.000.
Robert, Franz-Josef: *See—*
Barlage, Bruno; and Robert, Franz-Josef, 4,889,190, Cl. 172-49.500.
Robert Krups Stiftung & Co. KG: *See—*
Mahlich, Gotthard C.; and Borgmann, Michael, 4,889,041, Cl. 99-285.000.
Roberts, Bruce A.; and Burkes, Alice L., to Procter & Gamble Company, The. Crisp fruit or vegetable snack product and process. 4,889,730, Cl. 426-102.000.
Robinson, Alan S.: *See—*
Fuller, Mark; and Robinson, Alan S., 4,889,283, Cl. 239-11.000.
Roby, Gerard: *See—*
Sarton, Francois; and Roby, Gerard, 4,889,299, Cl. 248-72.000.
Rock, David A.: *See—*
Farkas, Richard W.; Rock, David A.; and Anderson, James H., 4,889,975, Cl. 219-548.000.
Rock, Erich; Rupprechter, Helmut; and Brustle, Klaus, to Julius Blum Gesellschaft M.B.H. Furniture hinge including hinge arm releasably connected to mounting plate. 4,888,853, Cl. 16-240.000.
Rockford, David B.; Sutton, William H.; Bond, Christopher R.; and Wilkinson, Brian, to Britoil PLC. Agitation and/or gas separation and dispersed gas flotation. 4,889,638, Cl. 210-703.000.
Rocklage, Scott M.; Cacheris, William P.; and Jamieson, Gene, to Salutar, Inc. Manganese (II) chelate manufacture. 4,889,931, Cl. 540-465.000.
Rockom, John W.; and Collier, Charles A., to Allpak Container, Inc. Insulated container. 4,889,252, Cl. 220-3.100.
Rodhe, Peder: *See—*
Zucker, Joseph; Shen, Nelson M.; Campbell, Bruce D.; Rodhe, Peder; and Call, Tom, 4,889,403, Cl. 350-96.150.
Rodime PLC: *See—*
Chalmers, Brian D.; Mackenzie, Colin A.; and Kapoor, Kishore K., 4,890,174, Cl. 360-78.120.
Rogers, Roy K. Propulsion system for a small vehicle. 4,888,949, Cl. 60-434.000.
Rohde, Siegfried: *See—*
Beyer, Hans-Ernst; Bonitz, Jorg; Entenmann, Robert; Forster, Siegmar; Knab, Rochus; Kunzel, Walter; Kugler, Wolfgang; Mahlberg, Alfred; Miller, Bernhard; Philipp, Matthias; Rohde, Siegfried; Unland, Stefan; Viess, Walter; Winter, Herbert; and Zimmermann, Jurgen, 4,889,094, Cl. 123-414.000.
Rohm GmbH: *See—*
Besecke, Sigmund; Knebel, Joachim; Schroeder, Guenter; and Ude, Werner, 4,889,909, Cl. 528-125.000.
Christner, Juergen; Pfleiderer, Ernst; and Taeger, Tilmann, 4,889,811, Cl. 435-265.000.
Siol, Werner; and Terbrack, Ulrich, 4,889,894, Cl. 525-227.000.
Rohr Industries, Inc.: *See—*
Cadwell, Gilbert C.; and Phillips, Paul M., 4,889,276, Cl. 228-265.000.
Rokos, George H. S., to STC PLC. Integrated circuits. 4,890,191, Cl. 361-313.000.
Roller, Lee E., to Tecumseh Products Company. Compliance brake for an internal combustion engine powered implement. 4,889,213, Cl. 192-1.440.
Rolls-Royce (1971) Limited: *See—*
Wilkinson, Wilfred H., 4,889,469, Cl. 415-191.000.
Roos, Leo; Axon, Fredrick J.; and Briguglio, James J., to Morton Thiokol, Inc. Method of forming a conformable mask on a printed circuit board. 4,889,790, Cl. 439-258.000.
Roppongi, Yasunobu: *See—*
Naitoh, Kazumi; Arakawa, Yoshiaki; Ikezaki, Takashi; Yabe, Shoji; Yokoyama, Yutaka; Hamaguchi, Yuichi; Roppongi, Yasunobu; and Hamaguchi, Yuichi, 4,889,536, Cl. 29-570.100.
Roques, Henri: *See—*
Aurelle, Yves; Bernasconi, Christian; Besombes-Vailhe, Jean; Julien, Edmond; and Roques, Henri, 4,889,537, Cl. 44-53.000.
Rorer Pharmaceutical Corporation: *See—*
Huang, Fu-chih, 4,889,868, Cl. 514-392.000.
Rosenberg, Larry; Chadwick, Curt H.; and Brudny, Alex, to KLA Instruments Corporation. Method of molding a precision surface in an instrument table. 4,889,676, Cl. 264-255.000.
Rosenberg, Peretz. Automatic shut-off valve. 4,889,154, Cl. 137-474.000.
Rosenberg, Siegfried; and Schwarzenbach, Kurt, to Ciba-Geigy Corporation. Use of phenol-mercaptocarboxylic acid esters as stabilizers for synthetic elastomers. 4,889,883, Cl. 524-289.000.
Rosenfield, Ronald H., to Alltech Services, Incorporated. Fruit juice extractor/straw. 4,889,044, Cl. 99-510.000.
Rosenthal, Walter. Smoking article means and methods of making the same. 4,889,142, Cl. 131-309.000.
Ross, Edward A. Bicycle safety toe clip. 4,889,010, Cl. 74-594.600.
Roszowski, Bogdan: *See—*
Hemsley, Stephen T.; and Roszowski, Bogdan, 4,889,287, Cl. 239-498.000.
Rothacher, Duane J.: *See—*
Williams, Richard K.; Bolger, Steven H.; and Rothacher, Duane J., 4,890,146, Cl. 357-23.800.
Rottweiller, Gerhard: *See—*
Heinzmann, Albert; and Rottweiller, Gerhard, 4,889,429, Cl. 366-71.000.
Rouse, Jack, to Pronto Auto Repair Dealerships Inc. Process and apparatus for the manufacture of radiator cooling fins. 4,888,972, Cl. 72-186.000.
Roush, David M.: *See—*
Lutomski, Kathryn A.; Roush, David M.; and Phillips, Richard B., 4,889,867, Cl. 514-365.000.
Rowan, Eugene V.; Karol, Thomas J.; and Farmer, Homer H., to R. T. Vanderbilt Company, Inc. Organic molybdenum complexes. 4,889,647, Cl. 252-42.700.
Rowell, William A.: *See—*
Farinacci, Michael F.; and Rowell, William A., 4,889,973, Cl. 219-528.000.
Rowen, Michael J., to Lutron Electronics Co., Inc. Master electrical load control system. 4,889,999, Cl. 307-31.000.
Rowson, Graham P.; Head, John C.; Westermann, Jurgen; Kruger, Martin; Arndt, Friedrich; and Rees, Richard, to Schering Agrochemicals. Herbicides. 4,889,553, Cl. 71-92.000.
Roy, Paul A., to Fiber-Speed International, Inc. Method of manufacturing golf club shafts. 4,889,575, Cl. 156-189.000.
Royce, Ralph R.; Kremer, Bernard K.; and Bisio, Paul D., to Procter & Gamble Company, The. Quench cooled particulate fabric softening composition. 4,889,643, Cl. 252-8.800.
Rozniecki, Edward J. Fire suppressant mechanism and method for sizing same. 4,889,189, Cl. 169-73.000.
Rubin, Leon J.: *See—*
Diosady, Levente L.; Rubin, Leon J.; and Tzeng, Yew-Min, 4,889,921, Cl. 530-377.000.
Rubinstein, Menachem: *See—*
Revel, Michel; Rubinstein, Menachem; and Mory, Yvez, 4,889,803, Cl. 435-69.510.
Rubiyat Software, Inc.: *See—*
Euler, James A., 4,890,326, Cl. 381-35.000.
RUD-Kettenfabrik Rieger & Dietz GmbH, u. Co.: *See—*
Zeiser, Peter; Kaiser, Helmut; and Rieger, Hansjorg, 4,889,172, Cl. 152-226.000.
Rudnick, Paul J., to Psicom Sports Incorporated. Electronic baseball card. 4,890,229, Cl. 364-410.000.
Rudolph, Arno, to Hewlett-Packard Company. Switch matrix. 4,890,267, Cl. 367-103.000.
Rueger, Heinrich: *See—*
Buhlmayer, Peter; Stanton, James L.; Fuhrer, Walter; Goschke, Richard; Rasetti, Vittorio; and Rueger, Heinrich, 4,889,869, Cl. 514-400.000.
Rullier, Pierre, to Salomon S.A. Front binding for a ski boot. 4,889,358, Cl. 280-628.000.

Rupp, Herbert E., III, to Rupp Marine, Inc. Sportfishing outrigger devices. 4,889,064, Cl. 114-89.000.
Rupp Marine, Inc.: *See—*
Rupp, Herbert E., III, 4,889,064, Cl. 114-89.000.
Rupprechter, Helmut: *See—*
Rock, Erich; Rupprechter, Helmut; and Brustle, Klaus, 4,888,853, Cl. 16-240.000.
Ruspa, Renzo. Mounting arrangement for positively fixing a wheel cover disk to the wheel rim of an industrial vehicle. 4,889,394, Cl. 301-37.0PB.
Russell, Gary; and Kozacky, Walter J., to Lockwood Technical, Inc. Solenoid driver system. 4,890,188, Cl. 361-154.000.
Russell, James P.: *See—*
Gurak, Nur R.; Thompson, Ronald J.; Russell, James P.; and Yarkovsky, Joseph M., 4,889,670, Cl. 264-50.000.
Russell, Ronald R. Molded case circuit breaker actuator-accessory unit. 4,890,184, Cl. 361-87.000.
Russell, Ronald W.; and Cox, Larry R., to Chrysler Motors Corporation. Folding seat hinge assembly with quick disconnect. 4,888,854, Cl. 16-266.000.
Russell, Thomas L., Jr., to American Telephone and Telegraph Company; and AT&T Bell Laboratories. Method and apparatus for subscription broadcast. 4,890,322, Cl. 380-20.000.
Ryan, John J., Jr.: *See—*
Bourbon, Robert M.; and Ryan, John J., Jr., 4,889,597, Cl. 162-157.600.
Ryan, Patrick J., to Alpha Mail System. Integrated modular portable mail tray delivery system and components. 4,889,397, Cl. 312-320.000.
Ryan, Robert F.: *See—*
Latif, Sherif; and Ryan, Robert F., 4,889,708, Cl. 424-43.000.
Ryham, Rolf. Method and apparatus for drying a particulate material such as bark. 4,888,882, Cl. 34-10.000.
Ryoden Kasei Co., Ltd.: *See—*
Ohashi, Masato; and Kodai, Shiyoojiro, 4,889,749, Cl. 428-13.000.
Rzeszotarski, Waclaw J.; and Mavunkel, Babu J., to Nova Pharmaceutical Corporation. Oximes of oxymorphone, naltrexone and naloxone as potent, selective opioid receptor agonists and antagonists. 4,889,860, Cl. 514-282.000.
S. C. Johnson & Son, Inc.: *See—*
Hagarty, John D., 4,889,710, Cl. 424-45.000.
Saab-Scania Aktiebolag: *See—*
Bergsten, Lars, 4,889,087, Cl. 123-90.310.
Sachse, Burkhard: *See—*
Ehrhardt, Heinz; Mildenberger, Hilmar; Maier, Thomas; Schaller, Rainer; Sachse, Burkhard; and Braun, Peter, 4,889,864, Cl. 514-326.000.
Sado, Shintaro: *See—*
Izunaga, Yasushi; Kuno, Hiroaki; and Sado, Shintaro, 4,889,471, Cl. 417-32.000.
SAES Getters SpA: *See—*
Succi, Marco, 4,889,814, Cl. 436-133.000.
Safe-T-Quake Corporation: *See—*
Lloyd, Hershall E.; and Lloyd, Monte E., 4,889,150, Cl. 137-39.000.
Saffer, Edmund, to Siemens Aktiengesellschaft. Biopsy means for an x-ray examination apparatus. 4,890,311, Cl. 378-99.000.
Safford, George J.: *See—*
Woolatt, Derek; and Safford, George J., 4,889,156, Cl. 137-516.130.
Sagara, Masaaki: *See—*
Takehana, Tsutomu; Kouzai, Tetsuo; Sagara, Masaaki; Yaginuma, Tamio; and Sasaki, Teruji, 4,888,936, Cl. 53-510.000.
Sahakian, Vahak K., to LSI Logic Corporation. Semiconductor package profile. 4,890,154, Cl. 357-74.000.
Sahlmen, Thomas: *See—*
Janiszewski, Gzegorz; Sahlmen, Thomas; and Nystrom, Mats, 4,889,217, Cl. 192-48.910.
Sai-Halasz, George A.: *See—*
Davari, Bijan; Ganin, Eti; Harame, David L.; and Sai-Halasz, George A., 4,889,819, Cl. 437-27.000.
Saiki, Albert K., to Panavision, Inc. Movie camera shutter. 4,889,424, Cl. 352-216.000.
Saiki, Randall K.: *See—*
Gelfand, David H.; Stoffel, Susanne; Lawyer, Frances C.; and Saiki, Randall K., 4,889,818, Cl. 435-194.000.
St. Denis, Carroll R., to Global Designs Inc. Tuning apparatus for stringed instruments. 4,889,029, Cl. 84-454.000.
Saint-Gobain Vitrage "Les Miroirs" : *See—*
Lecourt, Jean; Legros, Desire; and Granville, Andre, 4,889,547, Cl. 65-107.000.
Saito, Kiyokazu; and Imaizumi, Hiraku, to TDK Electronic Co., Ltd. Terminal fitted bobbin. 4,890,085, Cl. 336-192.000.
Saito, Koichi: *See—*
Yamamoto, Shinya; and Saito, Koichi, 4,889,229, Cl. 206-328.000.
Saito, Tadashi; Nakamura, Hiroshi; and Tsunotani, Masanori, to OKI Electric Industry Co., Ltd. Method of manufacturing schottky gate field transistor by ion implantation method. 4,889,817, Cl. 437-22.000.
Saito, Yoshihiro: *See—*
Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; and Takahashi, Satoru, 4,889,552, Cl. 71-92.000.
Saito, Yoshitane: *See—*
Hozumi, Kazuhiro; Arai, Masaru; and Saito, Yoshitane, 4,889,164, Cl. 137-625.640.
Saitoh, Masahiro: *See—*
Obata, Keiichi; Yoshida, Suguru; Saitoh, Masahiro; and Ono, Yoshinobu, 4,889,678, Cl. 264-313.000.
Sakai, Hiroyuki: *See—*
Miyagawa, Fumio; Sakai, Hiroyuki; and Takenouchi, Toshikazu, 4,890,155, Cl. 357-74.000.
Sakai, Jun: *See—*
Ishihara, Yasuoki; Obato, Fumio; Sakai, Jun; and Natsume, Takeshi, 4,889,687, Cl. 420-13.000.
Suenaga, Makoto; Obata, Fumio; Sakai, Jun; and Natsume, Takeshi, 4,889,688, Cl. 420-22.000.
Sakamoto, Keiji: *See—*
Kurakake, Mitsuo; and Sakamoto, Keiji, 4,890,046. Cl. 318-630.000.
Saksena, Anil K.; Wong, Jesse K.; and Mangiaracina, Pietro, to Schering Corporation. Inhibitors of slow reacting substance of anaphylaxis. 4,889,873, Cl. 514-560.000.
Sakuma, Kenji: *See—*
Marumo, Chihiro; Toida, Yoichi; Nemoto, Masatsugu; Iida, Junichi; and Sakuma, Kenji, 4,888,984, Cl. 73-105.000.
Sakurai, Hitoshi: *See—*
Oshima, Katsuhide; Murai, Toshiaki; Sakurai, Hitoshi; Igarashi, Shuji; Hanagata, Haruo; and Igarashi, Hidesato, 4,889,602, Cl. 204-38.100.
Salee, Gideon: *See—*
Durairaj, Bojayan; Peterson, Alex, Jr.; and Salee, Gideon, 4,889,891, Cl. 525-139.000.
Salem, Robert J.; and Holley, George H., to American Health Products, Inc. Portable belt monitor of physiological functions and sensors therefor. 4,889,131, Cl. 128-671.000.
Salemnick, Gad: *See—*
Vaya, Jacob; Ladkani, David; Schoenberger, Clara; Kaspi, Joseph; Salemnick, Gad; Yellin, Haim; and Cherkez, Stephan, 4,889,929, Cl. 540-318.000.
Salomon S.A.: *See—*
Rullier, Pierre, 4,889,358, Cl. 280-628.000.
Salter, James A.: *See—*
Van Broekhoven, Johannes A. M.; Geuze, Maarten M.; and Salter, James A., 4,889,914, Cl. 528-392.000.
Salutar, Inc.: *See—*
Rocklage, Scott M.; Cacheris, William P.; and Jamieson, Gene, 4,889,931, Cl. 540-465.000.
Samas, Mark V.: *See—*
Brosnan, Denis A.; Whetsel, James E.; Singer, Richard E.; Samas, Mark V.; Amos, Michael D.; and Kovarik, David P., 4,889,324, Cl. 266-157.000.
Sameca SA: *See—*
Geiser, Markus; and Juillerat, Pierre, 4,889,024, Cl. 82-127.000.
Sammons, Jack: *See—*
Goldberg, Murrell A.; and Sammons, Jack, 4,889,559, Cl. 106-21.000.
Sampson, Harold J.: *See—*
Beam, Don E.; and Sampson, Harold J., 4,890,198, Cl. 361-399.000.
Samsung Electronics Co., Ltd.: *See—*
Kim, Byung-Youn; Park, Yong-Bo; and Jung, Tae-Sung, 4,890,051, Cl. 323-313.000.
Sanchez, Richard E. Utility cut patch identification tag. 4,888,896, Cl. 40-630.000.
Sanchez, Robert. Utility shutoff method and device. 4,889,313, Cl. 251-74.000.
Sanders, Royden C., Jr.: *See—*
Forsyth, John L.; and Conant, John P., 4,889,438, Cl. 400-320.000.
Sandish, George R.; and Wischusen, Henry, III. Food and beverage cup package. 4,889,239, Cl. 206-611.000.
Sandoz Ltd.: *See—*
Henzi, Beat, 4,889,535, Cl. 8-639.000.
Wiedemann, Achim, 4,889,945, Cl. 558-186.000.
Sands, David C.: *See—*
El-Megeed, Mohamed E. A.; and Sands, David C., 4,889,810, Cl. 435-252.900.
Sandvik AB: *See—*
Karlsson, Kurt O.; and Karlsson, Leif E., 4,889,455, Cl. 408-188.000.
Sankey, James K.: *See—*
Hehn, Bruce A.; and Sankey, James K., 4,889,244, Cl. 211-41.000.
Sankyo Engineering Co., Ltd.: *See—*
Nakamura, Susumu; and Yokoi, Koichi, 4,889,480, Cl. 425-577.000.
Santha, Pal: *See—*
Balogh, Karoly; Dombay, Zsolt; Fodor, Karoly; Grega nee Toth, Erzebet; Lorik, Erno ; Magyar nee Tomorkenyi, Magdolna; Nagy, Jozsef; Pasztor, Karoly; Santha, Pal; Tarpai, Gyula; Toth, Istvan; and Urszin nee Simon, Eszter, 4,889,944, Cl. 558-171.000.
Sanwa Kagaku Kenkyusho Co., Ltd.: *See—*
Sawai, Kiichi; Kurono, Masayasu; Awaya, Juichi; Kojima, Akio; and Ninomiya, Hideaki, 4,889,715, Cl. 424-80.000.
Sanyo Electric Co., Ltd.: *See—*
Hirose, Shintaro, 4,890,286, Cl. 371-37.100.
Inoue, Hajime; and Tanaka, Mikio, 4,890,168, Cl. 358-335.000.
Sarda, Jean-Claude. Removable inking device for offset press. 4,889,051, Cl. 101-77.000.
Sardella, Louis M., to Prime Technology, Inc. Rotary-type feeder machines and methods. 4,889,331, Cl. 271-11.000.
Sari, Eric T. System for the treatment of edge supported substrates. 4,889,070, Cl. 118-64.000.
Sarli, Michael S.: *See—*
Chin, Arthur A.; Johnson, Ivy D.; Kresge, Charles T.; and Sarli, Michael S., 4,889,615, Cl. 208-113.000.
Sarrine, Robert J.; Garsee, Henry A.; Kelley, Charles D.; and Guadagno, Philip A., to Helena Laboratories Corporation. Automatic electrophoresis apparatus and method. 4,890,247, Cl. 364-571.040.

Sarton, Francois; and Roby, Gerard, to Legrand. Duct mounting fixture for securing a duct on a support section. 4,889,299, Cl. 248-72.000.

Sartor, Mariano, to Nordica S.P.A. Support adjuster device for the quarters of ski boots. 4,888,889, Cl. 36-117.000.

Sartorius GmbH: *See*—
Oldendorf, Christian; Maaz, Gunther; Nottbohm, Klaus; and Handwerk, Volker, 4,889,201, Cl. 177-25.140.
Oldendorf, Christian; Berg, Christoph; and Melcher, Franz-Josef, 4,890,246, Cl. 364-567.000.

Sasahara, Yuzuru: *See*—
Nakamaki, Shin; and Sasahara, Yuzuru, 4,888,994, Cl. 73-760.000.

Sasaki, Eiichi; Mori, Takashi; and Watanabe, Tetsuo, to Ricoh Company, Ltd. Thermal transfer type printing device capable of selecting ink sheets. 4,890,120, Cl. 346-76.0PH.

Sasaki, Hideki; Matsuoka, Shigeru; Matsuda, Eiji; Yonenaga, Hitoshi; and Fukushima, Masahito, to Hitachi, Ltd. Document editing apparatus having document collator function. 4,890,256, Cl. 364-900.000.

Sasaki, Kanemi, to Kokusai Denki Kabushiki Kaisha. Di-electric bandpass filter. 4,890,079, Cl. 333-206.000.

Sasaki, Koji: *See*—
Watanabe, Toshinori; Haruna, Koichi; Motoyama, Hiroshi; Nishigaki, Toru; Sasaki, Koji; Yakata, Teruo; and Watanabe, Yoshitaka, 4,890,227, Cl. 364-300.000.

Sasaki, Teruji: *See*—
Takehana, Tsutomu; Kouzai, Tetsuo; Sagara, Masaaki; Yaginuma, Tamio; and Sasaki, Teruji, 4,888,936, Cl. 53-510.000.

Sasamoto, Yasuhiko; Hasegawa, Shusaku; and Okazaki, Atsushi, to Taiyo Fishery Co., Ltd. Lobster-like food product and a process for producing the same. 4,889,742, Cl. 426-643.000.

Sasatani, Seiei: *See*—
Kim, Soonih; Takeda, Kazuhisa; and Sasatani, Seiei, 4,889,723, Cl. 424-450.000.

Sasayama, Takao: *See*—
Masuda, Ikuro; Kato, Kazuo; Sasayama, Takao; Nishio, Yoji; Kuboki, Shigeo; and Iwamura, Masahiro, 4,890,017, Cl. 307-446.000.

Sassmannshausen, Kunt O. Searchlight, in particular a portable searchlight with an accompanying current supply. 4,890,209, Cl. 362-348.000.

Sata, Nobuhiro, to Japan as represented by Director General of Agency of Industrial Science and Technology. Method for reactive preparation of a shaped body of inorganic compound of metal. 4,889,745, Cl. 427-12.000.

Sato, Fuminori: *See*—
Uno, Hitoshi; Kurokawa, Mikio; Sato, Fuminori; Naruto, Shunsuke; and Masuda, Yoshinobu, 4,889,858, Cl. 514-254.000.

Sato, Kaoru: *See*—
Inuyama, Toshihiko; Kimizuka, Junichi; Kusano, Akihisa; Sato, Kaoru; and Soya, Takashi, 4,890,288, Cl. 372-31.000.

Sato, Kazuhito, to Toshiba Kikai K. K. Apparatus for operating an injection compression molding machine. 4,889,478, Cl. 425-149.000.

Sato, Kensaku, to Hirose Electric Co., Ltd. Electrical connector. 4,889,501, Cl. 439-595.000.

Sato, Koichi; and Sawa, Tsutomu, to International Business Machines. Bill handling apparatus having right and left bill-shifting mechanisms. 4,889,240, Cl. 209-534.000.

Sato, Norio: *See*—
Usuki, Arimitsu; Mizutani, Tadashi; Fukushima, Yoshiaki; Fujimoto, Megumi; Fukumori, Kenzo; Kojima, Yoshitsugu; Sato, Norio; Kurauchi, Toshio; and Kamigaito, Osami, 4,889,885, Cl. 524-445.000.

Sato, Toshiharu: *See*—
Yoshikawa, Akihisa; Tajima, Masamichi; Watanabe Kunio; and Sato, Toshiharu, 4,889,036, Cl. 91-403.000.

Satoh, Fumio: *See*—
Tatsuoka, Toshio; Suzuki, Kenji; Satoh, Fumio; Miyano, Seiji; and Sumoto, Kunihiro, 4,889,853, Cl. 514-227.500.

Savin Corporation: *See*—
Gardiner, Kenneth W.; Hori, Tatsu; and Mangal, Norman F., 4,890,135, Cl. 355-299.000.

Savu, Patricia M.: *See*—
Flynn, Richard M.; and Savu, Patricia M., 4,889,656, Cl. 252-356.000.

Sawa, Tsutomu: *See*—
Sato, Koichi; and Sawa, Tsutomu, 4,889,240, Cl. 209-534.000.

Sawai, Kiichi; Kurono, Masayasu; Awaya, Juichi; Kojima, Akio; and Ninomiya, Hideaki, to Sanwa Kagaku Kenkyusho Co., Ltd. Composition containing organogermanium compound and immunity adjusting agent comprising the composition. 4,889,715, Cl. 424-80.000.

Scalzo, Augustine J., to Westinghouse Electric Corp. Compressor diaphragm assembly. 4,889,470, Cl. 415-209.200.

Scapecchi, Pier L.; Coghi, Giovanni; and Lanati, Paolo, to Alfa Lancia Industriale S.p.A. Automatic timing variation device for an internal combustion engine. 4,889,086, Cl. 123-90.150.

Scaramuzzo, John A., Jr.: *See*—
Watt, Charles R.; Groll, Frederick K.; and Scaramuzzo, John A., Jr., 4,890,172, Cl. 360-77.040.

Scarati, Mario A.: *See*—
Caporiccio, Gerardo; Strepparola, Ezio; and Scarati, Mario A., 4,889,939, Cl. 549-13.000.

Schachner, Aryeh; and Ovil, Yoel, to Waltap Ltd. Apparatus for performing a tracheostomy operation. 4,889,112, Cl. 128-200.260.

Schachter, Friedrich. Valve actuator for pocket lighter. 4,889,482, Cl. 431-344.000.

Schaller, Rainer: *See*—
Ehrhardt, Heinz; Mildenberger, Hilmar; Maier, Thomas; Schaller, Rainer; Sachse, Burkhard; and Braun, Peter, 4,889,864, Cl. 514-326.000.

Schapira, Thomas G.: *See*—
Geist, Jill M.; Messner Scott C.; and Schapira, Thomas G., 4,889,612, Cl. 204-416.000.

Schattenburg, Mark L.: *See*—
Smith, Henry I.; Anderson, Erik H.; and Schattenburg, Mark L., 4,890,309, Cl. 378-35.000.

Schaumann, Jon P.; Olander, Jitka V.; Hrakas, Nicholaos K.; and Feder, Joseph, to Monsanto Co. Monoclonal antibody specific for human colon fibroblast-derived T-PA. 4,889,922, Cl. 530-413.000.

Schefcsik, Nikolaus: *See*—
Senft, Ernst; Klemmer, Herbert; Uhl, Ullrich; Naumann, Emil; and Schefcsik, Nikolaus, 4,889,007, Cl. 74-506.000.

Schering Agrochemicals: *See*—
Rowson, Graham P.; Head, John C.; Westermann, Jurgen; Kruger, Martin; Arndt, Friedrich; and Rees, Richard, 4,889,553, Cl. 71-92.000.

Schering Aktiengesellschaft: *See*—
Wegner, Peter; Kruger, Hans-Rudolf; Baumert, Dietrich; and Joppien, Hartmut, 4,889,870, Cl. 514-429.000.

Schering Corporation: *See*—
Saksena, Anil K.; Wong, Jesse K.; and Mangiaracina, Pietro, 4,889,873, Cl. 514-560.000.

Scherzinger, Werner; and Neher, Paul, to SIPRA Patententwicklungs; and Beteiligungsgesellschaft mbH. Circular knitting machine. 4,888,963, Cl. 66-151.000.

Schettler, Helmut: *See*—
Klein, Klaus; Pollmann, Kurt; Schettler, Helmut; Schulz, Uwe; Wagner, Otto M.; and Zuehlke, Rainer, 4,890,238, Cl. 364-491.000.

Schiemann, Wolfram. Device suitable for use as a plastic can. 4,889,255, Cl. 220-83.000.

Schifferl, Ludwig, to Siemens Aktiengesellschaft. Arrangement for calculating the fuel injection quantity for an internal combustion engine. 4,889,101, Cl. 123-494.000.

Schladetsch, Hans J.: *See*—
Mischke, Peter; and Schladetsch, Hans J., 4,889,923, Cl. 534-597.000.

Schlage Lock Company: *See*—
Allison, James R.; and Bolin, Garry J., 4,890,093, Cl. 340-567.000.

Schleicher, Hans: *See*—
Goldhammer, Albert; Schleicher, Hans; Stangenberg, Hartmut; and Gasteier, Rolf, 4,889,291, Cl. 241-167.000.

Schlumpf, Alois, to Journomat AG. Vending machine for newspapers or periodicals. 4,889,221, Cl. 194-345.000.

Schmid, Karl H.; and Biermann, Manfred, to Henkel Kommanditgesellschaft auf Aktien. Process for the purification of alkyl glycosides, products obtainable by this process and their use. 4,889,925, Cl. 536-18.600.

Schmidt, Alan W.: *See*—
Kilk, Erik; Smith, David A.; and Schmidt, Alan W., 4,890,236, Cl. 364-485.000.

Schmidt, Christine M.: *See*—
Dixon, Peggy L.; and Schmidt, Christine M., 4,889,878, Cl. 523-200.000.

Schmidt, Reinhard: *See*—
Pinto, Akiva; Lucassen, Guenter; and Schmidt, Reinhard, 4,888,857, Cl. 19-80.00R.

Schmidt, Robert R.: *See*—
Forster, Heinz; Eue, Ludwig; Schmidt, Robert R.; and Lurssen, Klaus, 4,889,946, Cl. 560-21.000.

Schmiedel, James P.; and Moye, Lawrence D., to Square D Company. Terminal assembly for a coil. 4,889,505, Cl. 439-733.000.

Schmit, Frank L.; Redmon, David T.; and Ewing, Lloyd, to Water Pollution Control Corporation. In place gas cleaning of diffusion elements. 4,889,620, Cl. 210-137.000.

Schmuck, Leroy C.: *See*—
Frey, Robert A.; Woods, Gail E.; and Schmuck, Leroy C., 4,889,175, Cl. 160-90.000.

Schmulian, Marius; and Lake, David A. Divider for luggage and the like. 4,889,253, Cl. 220-22.100.

Schneider, Barry L.: *See*—
Mohiuddin, Mahmood; Schneider, Barry L.; and Kay, Paul O., 4,889,534, Cl. 604-339.000.

Schneider, Fernand: *See*—
Fischer, Ulf; Schneider, Fernand; and Widmer, Ulrich, 4,889,848, Cl. 514-212.000.

Schneider, Hartmut: *See*—
Klement, Ekkehard; Schneider, Hartmut; Karstensen, Holger; and Zrschizky, Helmut, 4,889,401, Cl. 350-96.120.

Schneider, Siegfried, to Siemens Aktiengesellschaft. Biomagnetic measuring installation. 4,889,124, Cl. 128-653.000.

Schneiderman, Simon. Exercise device. 4,889,336, Cl. 272-137.000.

Schnetter, Wolfgang: *See*—
Krieg, Aloisius; Huger, Alois; and Schnetter, Wolfgang, 4,889,918, Cl. 530-350.000.

Schoenberger, Clara: *See*—
Vaya, Jacob; Ladkani, David; Schoenberger, Clara; Kaspi, Joseph; Salemnick, Gad; Yellin, Haim; and Cherkez, Stephan, 4,889,929, Cl. 540-318.000.

Schofield, John A., to Shell Oil Company. Biochemical preparation of alkene derivatives. 4,889,804, Cl. 435-155.000.

Schofield, Paul; and Sewell, Graham P., to Almex Control Systems Limited. Ticket issuing machines. 4,889,437, Cl. 400-73.000.

Schoggen, Howard L.; Cook, Jeffrey T.; and Bourbon, Robert M., to Proter & Gamble Cellulose Company, The. Process for making individualized, crosslinked fibers and fibers thereof. 4,889,596, Cl. 162-157.600.

Schoggen, Howard L.: *See*—
Herron, Carlisle M.; Dean, Walter L.; Moore, Danny R.; Owens, James W.; and Schoggen, Howard L., 4,889,595, Cl. 162-157.600.

Schonenbrucher, Paul-Erich: *See*—
Wiese, Helmut; and Schonenbrucher, Paul-Erich, 4,889,206, Cl. 180-248.000.

Schornack, Louis W., to Perma Power Electronics, Inc. Line voltage fault detector for appliance protection. 4,890,002, Cl. 307-66.000.

Schornack, Louis W., to Perma Power Electronics, Inc. Standby power supply line voltage fault detector. 4,890,005, Cl. 307-87.000.

Schreiber, Hans. Device for mounting jaw casts in an articulator. 4,889,486, Cl. 433-60.000.

Schreiner Luchtvaartgroep B.V.: *See*—
Brambach, Johan A., 4,889,763, Cl. 428-246.000.

Schroder, Karl-Friedrich: *See*—
Kampen, Jan-Dieter; and Schroder, Karl-Friedrich, 4,889,461, Cl. 412-19.000.

Schroeder, Guenter: *See*—
Besecke, Sigmund; Knebel, Joachim; Schroeder, Guenter; and Ude, Werner, 4,889,909, Cl. 528-125.000.

Schubert, Frederic E.: *See*—
DiSanto, Frank J.; Krusos, Denis A.; and Schubert, Frederic E., 4,889,603, Cl. 204-180.100.

Schuhmann, Georg: *See*—
Burst, Hermann; Durm, Jurgen; Kretschmer, Helmut; and Schuhmann, Georg, 4,889,382, Cl. 296-180.500.

Schulz, Paul: *See*—
Amberg, Guenther; Bechstedt, Wolfgang; Schulz, Paul; and Trabitzsch, Uwe, 4,889,644, Cl. 252-8.900.

Schulz, Uwe: *See*—
Klein, Klaus; Pollmann, Kurt; Schettler, Helmut; Schulz, Uwe; Wagner, Otto M.; and Zuehlke, Rainer, 4,890,238, Cl. 364-491.000.

Schumacher'sche Fabrik GmbH & Co. KG: *See*—
Reinhardt, Alexander-Maria; and Reinhardt, Erich K., 4,889,630, Cl. 210-490.000.

Schupphaus, Herbert, to Gebr. Eickhoff Maschinenfabrik u. EisengieBerei mbH. Drum cutter-loader for underground mining machine. 4,889,393, Cl. 299-42.000.

Schuster, Ludwig; Hettche, Albert; Liedy, Werner; Weiss, Stefan; and Ehemann, Leo, to BASF Aktiengesellschaft. Oxidation of polyethylene. 4,889,897, Cl. 525-388.000.

Schuurman, Pieter J.: *See*—
Segerstrom, Clifford C.; Stil, Jacob H.; Schuurman, Pieter J.; and Eckstein, Gunter K., 4,889,540, Cl. 48-77.000.

Schwalm Electronics Inc.: *See*—
Hoffmann, Elmer L., 4,889,970, Cl. 219-271.000.

Schwarze, Rigobert. Pipe bending machine. 4,888,971, Cl. 72-157.000.

Schwarzenbach, Kurt: *See*—
Rosenberg, Siegfried; and Schwarzenbach, Kurt, 4,889,883, Cl. 524-289.000.

Schwiegerling, Paul E. Catheter-insertion forceps. 4,889,118, Cl. 606-108.000.

Scientific Atlanta, Inc.: *See*—
Seth-Smith, Nigel; Bates, Cameron; Lim, Samson; van Rassel, William; Yoneda, Robert; and Lucas, Keith, 4,890,321, Cl. 380-20.000.

Scientific-Atlantic, Inc.: *See*—
Seth-Smith, Nigel; Bates, Cameron: Lim, Samson; Rassel, William van; Yoneda, Robert; and Lucas, Keith, 4,890,319, Cl. 380-5.000.

Scott, Robert D.: *See*—
Zepernick, Dean E.; Olson, Donald R.; and Scott, Robert D., 4,889,153, Cl. 137-269.000.

Scripps Clinic and Research Foundation: *See*—
Shinnick, Thomas M.; Minden, Percy; and Houghten, Richard A., 4,889,800, Cl. 435-7.000.

Seagate Technology, Inc.: *See*—
Casey, Shawn E.; and West, Terence H., 4,890,176, Cl. 360-105.000.

Sears, Charles. Sound insulating container for an electrical appliance. 4,889,209, Cl. 181-200.000.

SEB S.A.: *See*—
Hantz, Dominique; Antoine, Dominique; and Jackowski, Bruno, 4,889,042, Cl. 99-340.000.

Sedgbeer, Melvyn D., to British Aerospace Pubic Limited Company. Radiation detector arrays having reduced number of signal paths. 4,889,984, Cl. 250-211.00R.

Sedy, Josef: *See*—
Amundson, Donald E.; Hamaker, Jon B.; Pecht, Glenn G.; and Sedy, Josef, 4,889,348, Cl. 277-1.000.

Segal, Moti: *See*—
Drori, Ze'Ev; and Segal, Moti, 4,890,108, Cl. 341-176.000.

Segerstrom, Clifford C.; Stil, Jacob H.; Schuurman, Pieter J.; and Eckstein, Gunter K., to Shell Oil Company. Apparatus for determination of slag tap blockage. 4,889,540, Cl. 48-77.000.

Seibert, Rudolf; and Cramer, Claus, to Siemensaktiengesellschaft. Capacitively buffered power supply for an electronic device. 4,890,003, Cl. 307-66.000.

Seiffe, Michael: *See*—
Kasan, Rodney; Seiffe, Michael; and Yellin, Haim, 4,889,724, Cl. 424-649.000.

Seinera, Henry; Luberne, Patricia; Stock, Claude; and Trouve, Patrick, to Pluess Staufer AG. Thermoplastic compositions with very high content of pulverized mineral materials for incorporation in polymers. 4,889,879, Cl. 524-13.000.

Seitz Enzinger Noll Maschinenbau Aktiengesellschaft: *See*—
Kaiser, Klaus, 4,889,642, Cl. 210-771.000.

Seitz, Michael E. A., to Standard Register Company, The. High solids CB printing ink. 4,889,877, Cl. 523-161.000.

Seki, Nagataka, to Kabushiki Kaisha Toshiba. Power converter device having starting circuits and a method for starting the power converter device. 4,890,213, Cl. 363-49.000.

Seki, Yukuharu; and Haraguchi, Noriyasu, to Mitsubishi Jukogyo Kabushiki Kaisha. Double facer. 4,889,580, Cl. 156-382.000.

Selectrons Ltd.: *See*—
Freedman, Herb, 4,890,215, Cl. 363-63.000.

Sell, F. Wayne, to Translift Systems, Inc. Movable tipping frame for hoist trucks. 4,889,464, Cl. 414-491.000.

Selle, Daniel; and Boissenot, Philippe, to U.S. Philips Corp. Method of manufacturing a semiconductor device of the hetero-junction bipolar transistor type. 4,889,821, Cl. 437-31.000.

Selle, Daniel; Boissenot, Philippe; and Rabinzohn, Patrick, to U.S. Philips Corp. Method of manufacture semiconductor device of the hetero-junction bipolar transistor type. 4,889,824, Cl. 437-31.000.

Semiconductor Energy Laboratory Co., Ltd.: *See*—
Yamazaki, Shunpei, 4,889,782, Cl. 430-57.000.
Yamazaki, Shunpei, 4,889,783, Cl. 430-57.000.

Senft, Ernst; Klemmer, Herbert; Uhl, Ullrich; Naumann, Emil; and Schefcsik, Nikolaus, to Daimler-Benz AG. Adjusting device for a vehicle parking brake. 4,889,007, Cl. 74-506.000.

Sengewald, Karl-Heinz. Tearable package of synthetic thermoplastic foil and device and method for producing the same. 4,889,523, Cl. 493-195.000.

Seno, Eugene T.: *See*—
Birmingham, Virginia A.; Cox, Karen L.; and Seno, Eugene T., 4,889,809, Cl. 435-252.300.

Sensabaugh, Andrew J., Jr.: *See*—
Pryor, James W.; Raker, Mark L.; Sensabaugh, Andrew J., Jr.; and Hauser, Henry A., 4,889,143, Cl. 131-331.000.

Serikawa, Toshiaki: *See*—
Takagi, Hiroshi; Serikawa, Toshiaki; and Tsunoda, Noriaki, 4,889,442, Cl. 401-194.000.

Sermatech International, Inc.: *See*—
Mosser, Mark F., 4,889,558, Cl. 106-14.120.

Serracant-Clermont, Jose M.; and Serracant-Clermont, Juan. System for treating fabrics in cord in closed ring. 4,888,848, Cl. 15-306.00A.

Serracant-Clermont, Juan: *See*—
Serracant-Clermont, Jose M.; and Serracant-Clermont, Juan, 4,888,848, Cl. 15-306.00A.

Seth-Smith, Nigel; Bates, Cameron; Lim, Samson; Rassel, William van; Yoneda, Robert; and Lucas, Keith, to Scientific-Atlantic, Inc. Method for controlling copying of protected information transmitted over a communications link. 4,890,319, Cl. 380-5.000.

Seth-Smith, Nigel; Bates, Cameron; Lim, Samson; van Rassel, William; Yoneda, Robert; and Lucas, Keith, to Scientific Atlanta, Inc. Communications format for a subscription television system permitting transmission of individual text messages to subscribers. 4,890,321, Cl. 380-20.000.

Sewell, Graham P.: *See*—
Schofield, Paul; and Sewell, Graham P., 4,889,437, Cl. 400-73.000.

Seyler, Peter G., to Perfection Spring & Stamping Corp. Multiple-strand torsion spring. 4,889,327, Cl. 267-168.000.

Seymour, Peter J.: *See*—
Ward, Marcus J. S.; and Seymour, Peter J., 4,889,373, Cl. 292-336.300.

Sezerman, Omur M. Tilt adjustable optical fibre connectors. 4,889,406, Cl. 350-96.210.

SGA-Thomson Microelectronics S.A.: *See*—
Ramet, Serge, 4,890,014, Cl. 307-355.000.

SGS Microelettronica Spa: *See*—
Bertotti, Franco; Ferrari, Paolo; and Gatti, Maria T., 4,890,149, Cl. 357-48.000.

SGS-Thomson Microelectronics GmbH: *See*—
Stockinger, Josef, 4,890,012, Cl. 307-296.500.

SGS-Thomson Microelectronics, SA: *See*—
Tailliet, Francois; and Kowalski, Jacek, 4,890,187, Cl. 361-111.000.

SGS-Thomson Microelectronics S.p.A.: *See*—
Musumeci, Salvatore; and Zambrano, Raffaele, 4,889,822, Cl. 437-31.000.

SGS-Thomson Microelectronics S.A.: *See*—
Tonnel, Eugene; and Thomas, Gilles, 4,890,142, Cl. 357-23.400.

Shaffer, Dennis E. Combined night light and pre-moistened towellette warmer. 4,890,205, Cl. 362-154.000.

Shaffer, Roy E. Lid remover. 4,889,018, Cl. 81-3.430.

Shakespeare Company: *See*—
Lewis, John R., Jr., 4,890,116, Cl. 343-749.000.

Shalaby, Shalaby W.: *See*—
Jamiolkowski, Dennis D.; Gaterud, Mark T.; Newman, Hugh D., Jr.; and Shalaby, Shalaby W., 4,889,119, Cl. 606-220.000.

Shama, Sami A.; and Derer, John L., to DeSoto, Inc. Ultraviolet-curable blends of acrylated polyurethanes and silsesquioxane oligomers having improved adhesion to glass. 4,889,901, Cl. 526-279.000.

Shamshoum, Edwar S.: *See*—
Miller, James G.; Pellet, Regis J.; Shamshoum, Edwar S.; and Rabo, Jule A., 4,889,616, Cl. 208-114.000.

Shano, Charles L., to Lectro Stik Corp. Wax applicator with electronic control. 4,889,440, Cl. 401-1.000.

Sharp Kabushiki Kaisha: *See—*
Arai, Nobushige, 4,889,601, Cl. 204-37.100.
Higashi, Kazutada; Tokuda, Masamori; Nakano, Hiroshi; and Ohta, Tomozo, 4,890,076, Cl. 332-170.000.
Sugihara, Takashi; and Hijikigawa, Masaya, 4,889,561, Cl. 106-196.000.
Taneya, Mototaka; Takahashi, Kosei; Hayakawa, Toshiro; Matsui, Sadayoshi; Matsumoto, Mitsuhiro; and Hosoba, Hiroyuki, 4,890,293, Cl. 372-46.000.
Tsugei, Shinji; Iguchi, Shigeki; and Inoue, Tomohiro, 4,890,258, Cl. 364-900.000.
Yoshida, Shinki, 4,890,243, Cl. 364-550.000.
Shatila, Mounir A., to Basic American Foods. Method for preparing quick-reconstituting foodstuffs. 4,889,734, Cl. 426-444.000.
Shattuck, Meredith D.: *See—*
Champ, Robert B.; Shattuck, Meredith D.; and Stremel, Donald A., 4,889,784, Cl. 430-58.000.
Sheets, Johnny S. Antitamper vent arrangement for a receptacle or enclosure. 4,889,160, Cl. 137-588.000.
Sheffield, Warren D.; and diZerega, Gere S., to Ethicon, Inc. Method for inhibiting post-surgical adhesion formation by the topical administration of tissue plasminogen activator. 4,889,722, Cl. 424-450.000.
Shell Internationale Research: *See—*
Lugtmeier, Lubbertus; and Klamer, Albert, 4,889,184, Cl. 166-80.000.
Shell Internationale Research Maatschappij B.V.: *See—*
Grosvenor, Peter R.; and Fuller, Lance S., 4,889,940, Cl. 549-81.000.
Shell Oil Company: *See—*
Drent, Eit, 4,889,913, Cl. 528-392.000.
DuBois, Donn A., 4,889,900, Cl. 526-77.000.
Schofield, John A., 4,889,804, Cl. 435-155.000.
Segerstrom, Clifford C.; Stil, Jacob H.; Schuurman, Pieter J.; and Eckstein, Gunter K., 4,889,540, Cl. 48-77.000.
Van Broekhoven, Johannes A. M.; Geuze, Maarten M.; and Salter, James A., 4,889,914, Cl. 528-392.000.
Van Doorn, Johannes A.; and Meijboom, Nicolaas, 4,889,956, Cl. 568-13.000.
Wang, Pen C., 4,889,907, Cl. 528-96.000.
Shen, Nelson M.: *See—*
Zucker, Joseph; Shen, Nelson M.; Campbell, Bruce D.; Rodhe, Peder; and Call, Tom, 4,889,403, Cl. 350-96.150.
Shenkar College of Textile Technology and Fashion, The: *See—*
Yescheskel, Herzel B.; Alon, Gad; and Beck, Eliezer, 4,888,856, Cl. 19-0.270.
Shepherd, Robin G.; Chai, Sie-Yearl; Lichty, Maynard E.; and Milowsky, Arnold S., to John Wyeth & Brotyher Limited. Process for preparing thiazolobenzimidazoles and intermediates used therein. 4,889,936, Cl. 548-149.000.
Sherry, Jeffrey B.: *See—*
Hansen, James R.; Nicholson, Myron D.; and Sherry, Jeffrey B., 4,889,751, Cl. 428-34.800.
Shibahata, Yasuji: *See—*
Furuya, Kunitaka; and Shibahata, Yasuji, 4,889,204, Cl. 180-197.000.
Shibatomi, Akihiro: *See—*
Ishii, Kazuaki; Futatsugi, Toshiro; Oshima, Toshio; Fujii, Toshio; Yokoyama, Naoki; and Shibatomi, Akihiro, 4,889,831, Cl. 437-184.000.
Shibuya, Kazunori: *See—*
Hamada, Tetsuro; Shimada, Kazuhiko; Masuda, Katsuhiko; and Shibuya, Kazunori, 4,889,353, Cl. 180-233.000.
Shih, Chuan: *See—*
Taylor, Edward C.; and Shih, Chuan, 4,889,859, Cl. 514-258.000.
Shimada, Kazuhiko: *See—*
Hamada, Tetsuro; Shimada, Kazuhiko; Masuda, Katsuhiko; and Shibuya, Kazunori, 4,889,353, Cl. 180-233.000.
Shimadzu Corporation: *See—*
Nadai, Tanekazu; and Kawara, Toshio, 4,889,528, Cl. 604-65.000.
Shimamune, Takayuki; and Hosonuma, Masashi, to Permelec Electrode Ltd. Process of producing titanium composite having a coil-shaped skeletal structure on the surface thereof. 4,889,685, Cl. 419-9.000.
Shimano Industrial Company Limited: *See—*
Nagano, Masashi, 4,889,521, Cl. 474-164.000.
Yamato, Yoshiro, 4,888,906, Cl. 43-24.000.
Shimizu Construction Co., Ltd.: *See—*
Takahashi, Takeshi; Nakamura, Masatake; Yabana, Yoshiji; Ishikawa, Toshiuyki; and Nagata, Koji, 4,889,958, Cl. 174-35.0MS.
Shimizu, Isoo; Matsumura, Yasuo; and Arai, Yutaka, to Nippon Petrochemical Company, Ltd. (Phenylethenyl) phenylpropionaldehyde and method for producing (benzolyphenyl) propionic acid using the same. 4,889,952, Cl. 562-460.000.
Shimmi, Hideo: *See—*
Suganuma, Noriyuki; and Shimmi, Hideo, 4,889,576, Cl. 156-249.000.
Shimozawa, Toru: *See—*
Yokoyama, Kenji; Nakayama, Masatoshi; Shimozawa, Toru; Ueda, Kunihiro; and Maruta, Fumio, 4,889,767, Cl. 428-336.000.
Shin-ichi, Suto: *See—*
Yoshinori, Koshida; Minoru, Isobe; and Shin-ichi, Suto, 4,889,220, Cl. 194-206.000.
Shinko Electric Industries Co., Ltd.: *See—*
Miyagawa, Fumio; Sakai, Hiroyuki; and Takenouchi, Toshikazu, 4,890,155, Cl. 357-74.000.
Shinko Kosen Kogyo Kabushiki: *See—*
Fujiwara, Tadayoshi; Yamaoka, Yukio; Hamada, Kazuichi; Yamada, Yoshiro; Kawaguchi, Yasunobu; Oki, Yasuhiro; Taniguchi, Takashi; and Takahashi, Hiroyuki, 4,889,567, Cl. 148-12.00B.
Shinnick, Thomas M.; Minden, Percy; and Houghten, Richard A., to Scripps Clinic and Research Foundation. Synthetic polypeptides and receptor molecules derived therefrom and methods of use. 4,889,800, Cl. 435-7.000.
Shinonaga, Hirohiko: *See—*
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 4,890,124, Cl. 346-160.000.
Shinozaki, Masatoshi: *See—*
Okada, Susumu; Imanaka, Makoto; Masui, Susumu; Obara, Takashi; Shinozaki, Masatoshi; and Tsunoyama, Kozo, 4,889,566, Cl. 148-2.000.
Shipley Company, Inc.: *See—*
Ausschnitt, Christopher P.; McFadden, Edward A.; and Tan, Raul V., 4,890,239, Cl. 364-491.000.
Shirai, Ryoichi: *See—*
Yamada, Yoshihiro; Shirai, Ryoichi; and Hayakawa, Youichi, 4,889,621, Cl. 210-168.000.
Shone, Robert L.: *See—*
Djuric, Stevan W.; Shone, Robert L.; and Yu, Stella S. T., 4,889,871, Cl. 514-456.000.
Showa Denko Kabushiki Kaisha and Nippon Chemi-Con Corporation: *See—*
Naitoh, Kazumi; Arakawa, Yoshiaki; Ikezaki, Takashi; Yabe, Shoji; Yokoyama, Yutaka; Hamaguchi, Yuichi; Roppongi, Yasunobu; and Hamaguchi, Yuichi, 4,889,536, Cl. 29-570.100.
Showscan Film Corporation: *See—*
Trumbull, Douglas, 4,889,423, Cl. 352-46.000.
Shroot, Braham; Lang, Gerard; Maignan, Jean; Restle , Serge; Hensby, Christopher; and Colin, Michel. 10-aryl-1,8-dihydroxy-9- anthrones and their esters. 4,889,865, Cl. 514-332.000.
Shubeck, Daniel. Automobile window card holder. 4,889,268, Cl. 224-277.000.
Shuey, Kenneth C., to Westinghouse Electric Corp. Distribution of line carrier communications. 4,890,089, Cl. 340-310.00A.
Shy, Max H., to McLaughlin Manufacturing Company. Rotary drill guard assembly and method. 4,889,193, Cl. 175-62.000.
Siedenburg, Jay: *See—*
Connolly, Joseph; Holt, Neil L.; Richardson, Anthony R. W.; and Siedenburg, Jay, 4,889,506, Cl. 439-874.000.
Siemens Aktiengesellschaft: *See—*
Ahmed, Syed M., 4,890,068, Cl. 330-253.000.
Auinger, Herbert, 4,890,049, Cl. 318-771.000.
Bertagnolli, Emmerich; and Weger, Peter, 4,889,823, Cl. 437-31.000.
Erbe, Ehrenfried, 4,890,329, Cl. 381-68.700.
Guentner, Herwig, 4,890,059, Cl. 324-174.000.
Kinzler, Hans; and Kotowicz, Aleksander, 4,888,970, Cl. 70-456.00R.
Kippenberg, Horst; Moser, Thomas; and Otto, Klaus, 4,889,760, Cl. 428-192.000.
Klement, Ekkehard; Schneider, Hartmut; Karstensen, Holger; and Zrschizky, Helmut, 4,889,401, Cl. 350-96.120.
Meyer, Serge-E-H, 4,890,330, Cl. 381-69.200.
Nerowski, Georg; Piepenbreier, Bernhard; and Toelle, Hans-Juergen, 4,890,181, Cl. 361-18.000.
Nilsson, Kenth, 4,890,122, Cl. 346-140.00R.
Saffer, Edmund, 4,890,311, Cl. 378-99.000.
Schifferl, Ludwig, 4,889,101, Cl. 123-494.000.
Schneider, Siegfried, 4,889,124, Cl. 128-653.000.
Trenkler, Gerhard; Wedekind, Reinhard; and Maier, Reinhard, 4,890,058, Cl. 324-158.0MG.
Willer, Josef, 4,889,827, Cl. 437-41.000.
Siemens-Bendix Automotive Electronics L.P.: *See—*
Lee, Ki W.; and Choi, Il-Hyun, 4,888,988, Cl. 73-204.260.
Siemensaktiengesellschaft: *See—*
Seibert, Rudolf; and Cramer, Claus, 4,890,003, Cl. 307-66.000.
Siemer, Dennis K. Method and apparatus for testing tape bond strength. 4,888,985, Cl. 73-150.00A.
Siliconix Incorporated: *See—*
Williams, Richard K.; Bolger, Steven H.; and Rothacher, Duane J., 4,890,146, Cl. 357-23.800.
Silke, Timothy L.: *See—*
Decker, Arnold F.; and Silke, Timothy L., 4,889,472, Cl. 417-46.000.
Silvestri, George J., Jr., to Westinghouse Electric Corp. Method for heat rate improvement in partial-arc steam turbine. 4,888,954, Cl. 60-660.000.
Silvetti, Anthony N., Jr.: *See—*
Silvetti, Anthony N., Sr.; and Silvetti, Anthony N., Jr., 4,889,844, Cl. 514-60.000.
Silvetti, Anthony N., Sr.; and Silvetti, Anthony N., Jr. Fructose containing wound healing preparation. 4,889,844, Cl. 514-60.000.
Simanjuntak, Johan H. Driven pile with transverse broadening in situ. 4,889,451, Cl. 405-244.000.
Simko, Richard T., to Information Storage Devices. High density integrated circuit analog signal recording and playback system. 4,890,259, Cl. 365-45.000.
Simmons, Richard E.: *See—*
Chilton, David C.; and Simmons, Richard E., 4,888,982, Cl. 73-81.000.

Simon, James W., Jr.; and Gorman, Kathleen, to United Technologies Corporation. Age hardenable dispersion strengthened high temperature aluminum alloy. 4,889,582, Cl. 148-12.70A.

Simon, Walter: *See—*
Grosswendt, Werner; Unterstein, Klaus; and Simon, Walter, 4,889,053, Cl. 102-348.000.

Simpson, Philip J., to Tate & Lyle Public Limited Company. Sucrose alkyl 4,6-orthoacylates. 4,889,928, Cl. 536-122.000.

Sims, Ernest E. Pickup truck tailgate accessory. 4,889,378, Cl. 296-57.100.

Singer, Richard E.: *See—*
Brosnan, Denis A.; Whetsel, James E.; Singer, Richard E.; Samas, Mark V.; Amos, Michael D.; and Kovarik, David P., 4,889,324, Cl. 266-157.000.

Singh, Raj N.; and Gaddipati, Achuta R., to General Electric Company. Composite containing coated fibrous material. 4,889,686, Cl. 419-13.000.

Sinha, Pradeep; and Rahman, Turhan F., to XOX Corporation. Solid-modeling system using topology directed subdivision for determination of surface intersections. 4,890,242, Cl. 364-518.000.

Siol, Werner; and Terbrack, Ulrich, to Rohm GmbH. Compatible polymer mixtures. 4,889,894, Cl. 525-227.000.

SIPRA Patententwicklungs: *See—*
Scherzinger, Werner; and Neher, Paul, 4,888,963, Cl. 66-151.000.

Sisk, David E. Molded hopper tee. 4,889,318, Cl. 251-356.000.

SKF GmbH: *See—*
Brandenstein, Manfred; and Hetterich, Herrmann, 4,888,862, Cl. 29-148.40A.
Brandenstein, Manfred; Herrmann, Gerhard; and Haas, Roland, 4,889,520, Cl. 474-135.000.

SKF Industrial Trading and Development Co. B.V.: *See—*
Vermeiren, Karel N., 4,888,976, Cl. 73-10.000.

Sloan, Mark D., to Brunner Engineering & Manufacturing Inc. System for use in providing compressed air for snow making equipment. 4,889,180, Cl. 165-30.000.

Smazik, Kenneth G., to Coca-Cola Company, The. Flow control valve for a dispensing system. 4,889,148, Cl. 137-1.000.

SMC Corporation: *See—*
Yoshikawa, Akihisa; Tajima, Masamichi; Watanabe Kunio; and Sato, Toshiharu, 4,889,036, Cl. 91-403.000.

Smiley, Gordon D. Hog feeder. 4,889,078, Cl. 119-53.500.

Smith, Daniel J.; and Patel, Sanjay R., to University of Akron. Wound dressing containing acrylate or methacrylate hydrogel polymer. 4,889,530, Cl. 604-304.000.

Smith, David A.: *See—*
Kilk, Erik; Smith, David A.; and Schmidt, Alan W., 4,890,236, Cl. 364-485.000.

Smith, David R.: *See—*
Cook, Sherry A.; Gerstle, Patrick J.; Smith, David R.; and Stilz, Kathryn R., 4,889,439, Cl. 400-706.000.

Smith, Henry I.; Anderson, Erik H.; and Schattenburg, Mark L., to Massachusetts Institute of Technology. Lithography mask with a π-phase shifting attenuator. 4,890,309, Cl. 378-35.000.

Smith, Ira A., to Coca-Cola Company, The. Motorless carbonator. 4,889,662, Cl. 261-35.000.

Smith, Joel C., Jr. Self-aligning post cutting jig. 4,889,329, Cl. 269-2.000.

Smith, Kevin K.: *See—*
Allsop, Bryan E.; Mabbitt, Allen W.; and Smith, Kevin K., 4,889,985, Cl. 250-214.00A.

Smith, Lawrence N., to Microelectronics and Computer Technology Corporation. Thin film capacitor. 4,890,192, Cl. 361-313.000.

Smith, Lowell S.; Engeler, William E.; and O'Donnell, Matthew, to General Electric Company. Two-dimensional phased array of ultrasonic transducers. 4,890,268, Cl. 367-138.000.

Smith, Ronald J.; Lerch, Thomas J.; and McLeod, Rick, to Hako Minuteman, Inc. Holder for rotary pad. 4,888,843, Cl. 15-98.000.

Smith, Terry B.: *See—*
Frost, Terry; Smith, Terry B.; and Vensel, Charles D., 4,889,463, Cl. 414-416.000.

Smoot, Lanny S.: *See—*
Judd, Thomas H.; and Smoot, Lanny S., 4,890,314, Cl. 379-53.000.

Snavely, Earl S., Jr.: *See—*
Jones, Timothy A.; and Snavely, Earl S., Jr., 4,889,701, Cl. 423-220.000.

Snyder, David A.; and Anderson, Johnny J., to Westinghouse Electric Corp. Eddy current probe apparatus having an expansible sleeve. 4,889,679, Cl. 376-258.000.

Sochor, Jerzy, to Amdahl Corporation. Zero insertion force connector. 4,889,499, Cl. 439-268.000.

Societa Cavi Pirelli S.p.A.: *See—*
Mariani, Beniamino; and Bortolin, Bruno, 4,889,399, Cl. 350-96.200.

Societe Anonyme Financiere, Industrielle et Commerciale d'Equipements Automobiles et Aeronautiques-FICEA: *See—*
Blanche, Andre, 4,890,202, Cl. 362-61.000.

Societe Nationale Elf Aquitaine (Production): *See—*
Elgue, Jean; Oliveau, Olivier; and Peytavy, Jean-Louis, 4,889,700, Cl. 423-220.000.

Societe Uranium Pechiney, Framatome & Cogema, & Cie: *See—*
Michel, Pirsoul, 4,889,663, Cl. 264-0.500.

Sogawa, Yoshiyuki, to Fuji Jukogyo Kabushiki Kaisha. Ignition timing control system. 4,889,095, Cl. 123-418.000.

Sollich GmbH & Co. KG: *See—*
Sollich, Helmut, 4,889,434, Cl. 374-25.000.

Sollich, Helmut, to Sollich GmbH & Co. KG. Apparatus for determining crystallization solidification curves of chocolate masses and similar fatty masses. 4,889,434, Cl. 374-25.000.

Solow, Terry S. Suction-ventilated shoe system. 4,888,887, Cl. 36-3.00R.

Solvay & Cie: *See—*
Dessart, Herman, 4,889,641, Cl. 210-752.000.
Malfroid, Pierre; Nguyen, Qui Long; Blondin, Jean-Marie; and Burnay, Jean-Paul, 4,889,892, Cl. 525-186.000.

Sommers, Kenneth C.; Wesson, David S.; and George, Kevin R., to Halliburton Services. Method and apparatus for retaining shaped charges. 4,889,183, Cl. 166-55.000.

Sondermeyer, Jack C.: *See—*
Brown, James W., Sr.; and Sondermeyer, Jack C., 4,890,331, Cl. 381-120.000.

Sonoco Products Company: *See—*
Adams, Samuel F.; and Bolz, Hans-Peter, 4,889,294, Cl. 242-118.300.

Sony Corporation: *See—*
Kondo, Tetsujiro, 4,890,161, Cl. 358-135.000.
Uedaira, Satoru; Suzuki, Masayuki; Yamanoi, Hiroshi; and Tamura, Hidemasa, 4,889,706, Cl. 423-593.000.
Umezu, Nubuhiko, 4,889,415, Cl. 350-358.000.

Sopko, Jeffrey J.: *See—*
Jaeger, Charles W.; Titterington, Donald R.; Le, Hu P.; and Sopko, Jeffrey J., 4,889,560, Cl. 106-27.000.

Sorensen, Terry J.; and Wyss, Bill W., to Avery International Corporation. Patterned adhesive label structures. 4,889,234, Cl. 206-459.000.

Soria, Claude: *See—*
Galline, Yves; and Soria, Claude, 4,889,110, Cl. 606-69.000.

Soriente, Alfonse J.; and Gurnari, Lawrence, to Graver Company, The. Lamella gravity separator. 4,889,624, Cl. 210-232.000.

Southwestern Bell Telephone Company: *See—*
Haydon, Robert, 4,889,977, Cl. 235-375.000.

Soward, Milton W.; and Bailey, F. Pat. Resilient wedge for core expander tool. 4,888,975, Cl. 72-392.000.

Soya, Takashi: *See—*
Inuyama, Toshihiko; Kimizuka, Junichi; Kusano, Akihisa; Sato, Kaoru; and Soya, Takashi, 4,890,288, Cl. 372-31.000.

Special Projects Manufacturing Inc.: *See—*
Lowrance, Dan E.; Douglas, Donald L.; and Merryfield, David W., 4,889,259, Cl. 221-75.000.

Spector, Donald. Rechargeable air freshener. 4,889,284, Cl. 239-34.000.

Spector, Donald. Controllable air freshener unit. 4,889,286, Cl. 239-47.000.

Spector, George: *See—*
Gage, Gene F., Sr.; and Spector, George, 4,890,091, Cl. 340-467.000.
Vu, Thuan D.; and Spector, George, 4,890,007, Cl. 307-118.000.

Spectra-Physics, Inc.: *See—*
Studebaker, Robert H.; Teach, Ted L.; and Kidwell, Michael H., 4,888,890, Cl. 37-103.000.

Spencer, Billie M.: *See—*
Zscheile, John W., Jr.; Lundquist, Alan E.; and Spencer, Billie M., 4,890,297, Cl. 375-1.000.

Sperry Marine Inc.: *See—*
Bean, Donald E.; and Coleman, Billy M., 4,890,105, Cl. 341-116.000.

Spink, Donald R.; and Stein, Jerry Y., to University of Waterloo. Recovery of zinc values from zinc and iron-bearing sulfide materials. 4,889,694, Cl. 423-110.000.

Spirella AG: *See—*
Baumann, Heinz, 4,888,835, Cl. 4-609.000.

Sprague, Larry A.: *See—*
Peterson, Arnold N.; and Sprague, Larry A., 4,889,169, Cl. 144-208.00J.

Springthorpe, Anthony J.; Margittai, Agnes; and Eger, David, to Northern Telecom Limited. Zinc diffusion in the presence of cadmium into indium phosphide. 4,889,830, Cl. 437-167.000.

Square D Company: *See—*
Schmiedel, James P.; and Moye, Lawrence D., 4,889,505, Cl. 439-733.000.

Stahlhofen, Paul; and Frass, Hans W., to Hoechst Aktiengesellschaft. Photosensitive composition, photosensitive copying material prepared from this composition with thermal hardening symmetric triazine alkyl(aryl)-ether. 4,889,788, Cl. 430-191.000.

Stahlhofen, Paul, to Hoechst Aktiengsellschaft. Photosensitive composition and photosensitive copying material prepared therefrom wherein composition has a thermal crosslinking urethane formaldehyde condensate. 4,889,789, Cl. 430-191.000.

Staller, Joseph M.: *See—*
Tucker, Robert L.; and Staller, Joseph M., 4,889,590, Cl. 156-647.000.

Standard Products Company, The: *See—*
Vaughan, Robert A.; and Belser, John W., 4,888,929, Cl. 52-400.000.

Standard Register Company, The: *See—*
Seitz, Michael E. A., 4,889,877, Cl. 523-161.000.

Stanforth, Robert R., to RMT, Inc. Method and mixture for treating hazardous wastes. 4,889,640, Cl. 210-751.000.

Stangenberg, Hartmut: *See—*
Goldhammer, Albert; Schleicher, Hans; Stangenberg, Hartmut; and Gasteier, Rolf, 4,889,291, Cl. 241-167.000.

Stanley, James P.: *See—*
Fan, You-Ling; Stanley, James P.; and Brode, George L., 4,889,887, Cl. 524-510.000.

Stanton, James L.: *See—*
Buhlmayer, Peter; Stanton, James L.; Fuhrer, Walter; Goschke, Richard; Rasetti, Vittorio; and Rueger, Heinrich, 4,889,869, Cl. 514-400.000.

Star Beam, Inc.: *See—*
Jones, Danny C., 4,890,207, Cl. 362-233.000.

State Industries, Inc.: *See—*
Vago, Otto Z.; and Wenczl, Ernest, 4,889,105, Cl. 126-361.000.

STC PLC: *See—*
Rokos, George H. S., 4,890,191, Cl. 361-313.000.

Stealy, Charles W. Detachable flywheel weights for altering motorcycle engine performance. 4,889,011, Cl. 74-604.000.

Steeper, Timothy J., to United States of America, Energy. Leak detection aid. 4,888,979, Cl. 73-40.700.

Steffes, William J., to Coleman Outdoor Products, Inc. Container with multiple position lid. 4,889,257, Cl. 220-331.000.

Steidinger, Donald J., to Wallace Computer Services, Inc. Method of producing a printed mailer form. 4,889,278, Cl. 229-92.100.

Stein, Jerry Y.: *See—*
Spink, Donald R.; and Stein, Jerry Y., 4,889,694, Cl. 423-110.000.

Stein, William W.; and Miller, Lawrence J., to Tektronix, Inc. Method of forming a pattern of conductor runs on a sheet of dielectric material. 4,889,573, Cl. 156-89.000.

Steinberg, Fritz: *See—*
Hudspeth, Thomas; and Steinberg, Fritz, 4,890,118, Cl. 343-786.000.

Stephen, John F.: *See—*
Nelson, Richard V.; and Stephen, John F., 4,889,882, Cl. 524-100.000.

Stevens, Peter A. Disposable lancet. 4,889,117, Cl. 606-181.000.

Stewart Hughes Limited: *See—*
Fisher, Celia E.; and Forfitt, Roy, 4,888,948, Cl. 60-223.000.

Stewart Stamping Corporation: *See—*
Philippson, Walter M.; Brennan, Robert J.; and Meighen, Terrence, 4,889,503, Cl. 439-610.000.

Stewart, Thomas, to Trinity Industries, Inc. Cover and latching mechanism for rail car loading hatch. 4,889,056, Cl. 105-377.000.

STFI: *See—*
Andersson, Birgitta S.; Zethraeus, Malin C.; Herngren, Torbjorn; and Gustafsson, Jan-Erik V., 4,889,592, Cl. 162-29.000.

Stickles, David L.: *See—*
Brown, Paul L.; and Stickles, David L., 4,889,753, Cl. 428-40.000.

Stieler, Fred: *See—*
Szekely, Ladislau, deceased; and Stieler, Fred, 4,889,555, Cl. 75-0.50R.

Stil, Jacob H.: *See—*
Segerstrom, Clifford C.; Stil, Jacob H.; Schuurman, Pieter J.; and Eckstein, Gunter K., 4,889,540, Cl. 48-77.000.

Stilz, Kathryn R.: *See—*
Cook, Sherry A.; Gerstle, Patrick J.; Smith, David R.; and Stilz, Kathryn R., 4,889,439, Cl. 400-706.000.

Stipp, Gordon K.: *See—*
Powers, John R.; Stipp, Gordon K.; Strobel, Rudolf G. K.; and Tsai, Chee-Hway, 4,889,739, Cl. 426-599.000.

Stock, Claude: *See—*
Seinera, Henry; Luberne, Patricia; Stock, Claude; and Trouve, Patrick, 4,889,879, Cl. 524-13.000.

Stockinger, Josef, to SGS-Thomson Microelectronics GmbH. An integrated controlled FET switch. 4,890,012, Cl. 307-296.500.

Stockton, Warren D.: *See—*
Miller, Michael K.; and Stockton, Warren D., 4,888,898, Cl. 42-49.010.

Stoffel, Susanne: *See—*
Gelfand, David H.; Stoffel, Susanne; Lawyer, Frances C.; and Saiki, Randall K., 4,889,818, Cl. 435-194.000.

Stohs, Norbert E., to American Telephone and Telegraph Company, 02; and AT & T Laboratories. Redundant termination of a communication line for maintaining the line properly terminated when one of the terminations is unpowered. 4,890,271, Cl. 369-24.000.

Stonestreet, Paul R.: *See—*
Phillips, Robert B.; and Stonestreet, Paul R., 4,889,319, Cl. 251-368.000.

Storage Technology Corporation: *See—*
Young, James R.; and Moy, Michael, 4,889,982, Cl. 235-494.000.

Strange, Booth B. Marine pollution containment device. 4,889,447, Cl. 405-60.000.

Straver, Willibrordus G. M. M.; and Nordholt, Ernst H., to U.S. Philips Corporation. Envelope detector. 4,890,066, Cl. 329-369.000.

Stremel, Donald A.: *See—*
Champ, Robert B.; Shattuck, Meredith D.; and Stremel, Donald A., 4,889,784, Cl. 430-58.000.

Strepparola, Ezio: *See—*
Caporiccio, Gerardo; Strepparola, Ezio; and Scarati, Mario A., 4,889,939, Cl. 549-13.000.

Strobel, Rudolf G. K.: *See—*
Powers, John R.; Stipp, Gordon K.; Strobel, Rudolf G. K.; and Tsai, Chee-Hway, 4,889,739, Cl. 426-599.000.

Strong, Russell W.; and van Quekelberghe, Eric P. J., to Ford New Holland, Inc. Overlapping rasp bar rotor for axial flow combines. 4,889,517, Cl. 460-66.000.

Strosberg, Gordon G.; Janotik, Adam M.; and Gentle, Derek F., to Ford Motor Company. Closure panel for automative bodies. 4,888,919, Cl. 49-502.000.

Strother, John M. Level for weightlifting. 4,888,875, Cl. 33-347.000.

Stuart, Frank A.: *See—*
Tyson, William H., Jr.; and Stuart, Frank A., 4,889,618, Cl. 208-162.000.

Studebaker, Robert H.; Teach, Ted L.; and Kidwell, Michael H., to Spectra-Physics, Inc. Laser control of excavating machine digging depth. 4,888,890, Cl. 37-103.000.

Stupp, Edward H.: *See—*
Vera, Eduardo S.; and Stupp, Edward H., 4,890,150, Cl. 357-52.000.

Su, Kai C.; and White, Jack C., to Ciba-Geigy Corporation. Apparatus for venting of gases from contact lens cases. 4,889,693, Cl. 422-113.000.

Succi, Marco, to SAES Getters SpA. Method and apparatus for detection of trace impurities in an impure inert gas. 4,889,814, Cl. 436-133.000.

Sudo, Ryoichi: *See—*
Horigome, Shinkichi; Niihara, Toshio; Ohta, Norio; Sugita, Yutaka; Miyamura, Yoshinori; Sudo, Ryoichi; Miwa, Hiroaki; and Tajima, Tetsuo, 4,889,757, Cl. 428-64.000.

Suenaga, Makoto; Obata, Fumio; Sakai, Jun; and Natsume, Takeshi, to Honda Giken Kogyo K.K.; and Hitachi Metals, Ltd. Process of producing nodular cast iron. 4,889,688, Cl. 420-22.000.

Sugama, Toshifumi, to Associated Universities, Inc. Polyacid macromolecule primers. 4,889,718, Cl. 428-343.000.

Suganuma, Noriyuki; and Shimmi, Hideo, to Toray Silicone Company Limited. Method for joining silicone-coated fabrics. 4,889,576, Cl. 156-249.000.

Sugihara, Katsutoshi. Speaker enclosures. 4,889,208, Cl. 181-148.000.

Sugihara, Takashi; and Hijikigawa, Masaya, to Sharp Kabushiki Kaisha. Moisture sensitive material. 4,889,561, Cl. 106-196.000.

Sugimoto, Masanori: *See—*
Miyama, Hidetoshi; Sugimoto, Masanori; and Kawaguchi, Kouji, 4,889,968, Cl. 219-121.700.

Sugita, Yutaka: *See—*
Horigome, Shinkichi; Niihara, Toshio; Ohta, Norio; Sugita, Yutaka; Miyamura, Yoshinori; Sudo, Ryoichi; Miwa, Hiroaki; and Tajima, Tetsuo, 4,889,757, Cl. 428-64.000.

Sullivan, James J.; and Dixit, Nagaraj S., to Colgate-Palmolive Company. Non-aqueous, nonionic heavy duty laundry detergent with improved stability using microsperes and/or vicinal-hydroxy compounds. 4,889,652, Cl. 252-99.000.

Sulzer-Escher Wyss Ag: *See—*
Hoppe, Bernd, 4,889,627, Cl. 210-360.200.

Sulzer, James H., to Leggett & Platt, Incorporated. Knee-action chair control. 4,889,384, Cl. 297-302.000.

Sumitomo Chemical Company, Ltd.: *See—*
Ohtsubo, Toshiro; Tsuda, Shigenori; Manabe, Yukio; Kasamatsu, Kiyoshi; Takeda, Hisami; and Tsuji, Kozo, 4,889,719, Cl. 424-408.000.
Takao, Hiroyoshi; Tanimoto, Yoshio; and Ikeda, Kiyosi, 4,889,881, Cl. 524-91.000.

Sumitomo Electric Industries, Ltd.: *See—*
Nishiyama, Yukinori; Fujioka, Hideaki; Yamaguchi, Hisaaki; Ikeda, Toshiki; and Miyoshi, Keisuke, 4,889,093, Cl. 123-400.000.

Sumoto, Kunihiro: *See—*
Tatsuoka, Toshio; Suzuki, Kenji; Satoh, Fumio; Miyano, Seiji; and Sumoto, Kunihiro, 4,889,853, Cl. 514-227.500.

Sun, Horng-Jye, to Teledyne MEC. FET monolithic microwave integrated circuit variable attenuator. 4,890,077, Cl. 333-81.00A.

Sun Microsystems: *See—*
Griffith, Scott J., 4,890,270, Cl. 368-113.000.

Sunpower, Inc.: *See—*
Beale, William T., 4,888,950, Cl. 60-520.000.
Beale, William T., 4,888,951, Cl. 60-520.000.

Suntory Limited: *See—*
Tatsuoka, Toshio; Suzuki, Kenji; Satoh, Fumio; Miyano, Seiji; and Sumoto, Kunihiro, 4,889,853, Cl. 514-227.500.
Tazawa, Toshiaki; Yotsumoto, Masahiro; Tanahashi, Hiroshi; and Wakabayashi, Yuzuru, 4,889,743, Cl. 426-495.000.

Suroff, Hyman. Wheel locking apparatus. 4,888,969, Cl. 70-226.000.

Survival Technology, Inc.: *See—*
Greenwold, Douglas J.; and Reinhold, Herbert E., Jr., 4,889,134, Cl. 128-696.000.

Suspension Group, Ltd.: *See—*
Booher, Benjamin V., 4,889,361, Cl. 280-718.000.

Sutton, Fredrick E.: *See—*
Mitchell, Terry L.; Sutton, Fredrick E.; and Sutton, Todd A., 4,889,396, Cl. 312-221.000.

Sutton, Todd A.: *See—*
Mitchell, Terry L.; Sutton, Fredrick E.; and Sutton, Todd A., 4,889,396, Cl. 312-221.000.

Sutton, William H.: *See—*
Rockford, David B.; Sutton, William H.; Bond, Christopher R.; and Wilkinson, Brian, 4,889,638, Cl. 210-703.000.

Suzuki, Hiroyoshi; Nishiyama, Ryoji; and Nishida, Shinichi, to Mitsubishi Denki Kabushiki Kaisha. Air-fuel ratio detecting apparatus for an internal combustion engine equipped with a heater controller. 4,889,098, Cl. 123-489.000.

Suzuki Jidosha Kogyo Kabushiki Kaisha: *See—*
Ozaki, Tadayuki, 4,889,081, Cl. 123-52.00M.

Suzuki, Kazuyoshi: *See—*
Maeda, Yoshiyasu; Inoue, Yasuhiro; Uno, Toshiyuki; and Suzuki, Kazuyoshi, 4,888,945, Cl. 57-264.000.

Suzuki, Kenji: *See—*
Tatsuoka, Toshio; Suzuki, Kenji; Satoh, Fumio; Miyano, Seiji; and Sumoto, Kunihiro, 4,889,853, Cl. 514-227.500.

Suzuki, Masayuki: *See*—
Uedaira, Satoru; Suzuki, Masayuki; Yamanoi, Hiroshi; and Tamura, Hidemasa, 4,889,706, Cl. 423-593.000.
Suzuki, Ryuichi: *See*—
Umetani, Keiji; Ueda, Ken; Suzuki, Ryuichi; and Yokouchi, Hisatake, 4,890,310, Cl. 378-82.000.
Suzuki, Shigeru: *See*—
Takeda, Akihiko; Kaneda, Hiroyuki; and Suzuki, Shigeru, 4,889,079, Cl. 123-41.82R.
Suzuki, Shinichiro: *See*—
Tsuchiya, Shozo; Aoki, Nobuo; and Suzuki, Shinichiro, 4,889,791, Cl. 430-270.000.
Suzuki, Toshio, to Toray Silicone Company Limited. Curable organopolysiloxane composition. 4,889,905, Cl. 528-30.000.
Suzuki, Toshio: *See*—
Ona, Isao; Naganawa, Tsutomu; Suzuki, Toshio; and Okawa, Tadashi, 4,889,770, Cl. 428-447.000.
Suzuki, Yasuyosi, to Mitsubishi Petrochemical Co., Ltd. Process for producing foamed thermoplastic resin articles. 4,889,669, Cl. 264-45.900.
Svec, Frantisek; Bleha, Miroslav; Tennikova, Tatiana B.; and Belenkii, Boris G., to Ceskoslovenska Akademie ved. Macroporous polymeric membranes for the separation of polymers and a method of their application. 4,889,632, Cl. 210-500.280.
Sweet, Martin, to Raychem Limited. Circuit protection device. 4,890,182, Cl. 361-56.000.
Syntex (U.S.A.) Inc.: *See*—
Pfister, Jurg R.; Davis, Roman; and Lee, Chi-Ho, 4,889,866, Cl. 514-347.000.
Szekely, Ladislau, deceased (by Daniello, Helene, legal representative); and Stieler, Fred, to Metallgesellschaft Aktiengesellschaft. Process of making binderless briquets from steelworks dusts. 4,889,555, Cl. 75-0.50R.
Tabata, Hiroshi; and Akiyama, Akihiko, to Honda Giken Kogyo Kabushiki Kaisha. Deceleration sensor. 4,889,068, Cl. 116-203.000.
Tabata, Keiji: *See*—
Akutsu, Mitsuo; and Tabata, Keiji, 4,889,672, Cl. 264-63.000.
Tachibana, Tadashi: *See*—
Hashimoto, Masashi; and Tachibana, Tadashi, 4,890,262, Cl. 365-200.000.
Taeger, Tilmann: *See*—
Christner, Juergen; Pfleiderer, Ernst; and Taeger, Tilmann, 4,889,811, Cl. 435-265.000.
Tagomori, Sadaaki: *See*—
Ogou, Sunoo; Ishii, Shigemichi; Tagomori, Sadaaki; Fukushima, Takuo; and Hayashida, Yasumasa, 4,889,312, Cl. 249-216.000.
Taguchi, Hiromi: *See*—
Katoh, Hiroshi; Taguchi, Hiromi; and Kikunaga, Shoji, 4,890,177, Cl. 360-107.000.
Taguchi, Yoshinori; and Yamanami, Tsuguya, to Wacom Co., Inc. Coordinate input device with display. 4,890,096, Cl. 340-712.000.
Tahara, Hideo; Makihara, Novuo; and Ono, Hiroshi, to Nissan Motor Co., Ltd. Outboard propulsion unit supporting system. 4,889,507, Cl. 440-61.000.
Tailliet, Francois; and Kowalski, Jacek, to SGS-Thomson Microelectronics, SA. Integrated circuit protected against electrostatic discharges, with variable protection threshold. 4,890,187, Cl. 361-111.000.
Taisha, Akira: *See*—
Kawabata, Takeo; Miyashita, Masahiko; and Taisha, Akira, 4,889,934, Cl. 546-151.000.
Taiyo Fishery Co., Ltd.: *See*—
Sasamoto, Yasuhiko; Hasegawa, Shusaku; and Okazaki, Atsushi, 4,889,742, Cl. 426-643.000.
Tajima, Masamichi: *See*—
Yoshikawa, Akihisa; Tajima, Masamichi; Watanabe Kunio; and Sato, Toshiharu, 4,889,036, Cl. 91-403.000.
Tajima, Tetsuo: *See*—
Horigome, Shinkichi; Niihara, Toshio; Ohta, Norio; Sugita, Yutaka; Miyamura, Yoshinori; Sudo, Ryoichi; Miwa, Hiroaki; and Tajima, Tetsuo, 4,889,757, Cl. 428-64.000.
Takada, Hideaki: *See*—
Inohana, Haruyuki; Takaoka, Saburo; and Takada, Hideaki, 4,890,170, Cl. 360-65.000.
Takagi, Hiroshi; Serikawa, Toshiaki; and Tsunoda, Noriaki, to Mitsubishi Pencil Co., Ltd. Writing instrument with ink quantity of level detecting function. 4,889,442, Cl. 401-194.000.
Takahashi, Chusei, to Oki Electric Industry Co., Ltd. Apparatus for judging quality of mobile data communication. 4,890,332, Cl. 455-67.000.
Takahashi, Hiroyuki: *See*—
Fujiwara, Tadayoshi; Yamaoka, Yukio; Hamada, Kazuichi; Yamada, Yoshiro; Kawaguchi, Yasunobu; Oki, Yasuhiro; Taniguchi, Takashi; and Takahashi, Hiroyuki, 4,889,567, Cl. 148-12.00B.
Takahashi, Kiyoshi: *See*—
Nakazato, Katsuo; Tsuchiya, Hiroyoshi; Kurosawa, Toshiharu; Maruyama, Yuji; and Takahashi, Kiyoshi, 4,890,167, Cl. 358-443.000.
Takahashi, Kosei: *See*—
Taneya, Mototaka; Takahashi, Kosei; Hayakawa, Toshiro; Matsui, Sadayoshi; Matsumoto, Mitsuhiro; and Hosoba, Hiroyuki, 4,890,293, Cl. 372-46.000.
Takahashi, Ryuichi, to Fuji Photo Film Co., Ltd. Light-sensitive material containing silver halide, reducing agent polymerizable compound and color forming system and comprising microcapsules having different mean grain sizes. 4,889,786, Cl. 430-138.000.
Takahashi, Satoru: *See*—
Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; and Takahashi, Satoru, 4,889,552, Cl. 71-92.000.
Takahashi, Takeshi; Nakamura, Masatake; Yabana, Yoshiji; Ishikawa, Toshiuyki; and Nagata, Koji, to Shimizu Construction Co., Ltd. Building with electromagnetic shield structure for individual floors. 4,889,958, Cl. 174-35.0MS.
Takahashi, Toyoki: *See*—
Yamaoka, Masayoshi; Tsutsui, Kiyomi; Inoue, Tadashi; and Takahashi, Toyoki, 4,888,993, Cl. 73-760.000.
Takakura, Koichi: *See*—
Tanihara, Masao; Oka, Kiichiro; Yamada, Hideaki; Kobayashi, Akira; Nakashima, Toshihide; Omura, Yoshiaki; and Takakura, Koichi, 4,889,917, Cl. 530-324.000.
Takanabe, Kazunori; Yamamoto, Masaki; Ito, Kenzo; and Fujinami, Hiroshi, to Nippondenso Co., Ltd. Electronic map display system for use on vehicle. 4,890,104, Cl. 340-995.000.
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, to Victor Company of Japan, Ltd. Printing apparatus utilizing an electric field applied between a charge storage layer on a transfer drum and a photoconductive layer member. 4,890,124, Cl. 346-160.000.
Takano, Mitsuyoshi, to Anritsu Corporation. Signal analyzer having partially scrolling function for display screen. 4,890,099, Cl. 340-724.000.
Takao, Hiroyoshi; Tanimoto, Yoshio; and Ikeda, Kiyosi, to Sumitomo Chemical Company, Limited. Ethylene-α-olefin vulcanized rubber composition. 4,889,881, Cl. 524-91.000.
Takao Kinzoku Kogyo Co., Ltd.: *See*—
Iida, Hajime; and Nakamura, Tadashi, 4,889,967, Cl. 219-87.000.
Takaoka, Saburo: *See*—
Inohana, Haruyuki; Takaoka, Saburo; and Takada, Hideaki, 4,890,170, Cl. 360-65.000.
Takatsu, Norihiko: *See*—
Kimura, Keita; Takatsu, Norihiko; and Yamamoto, Tetsuya, 4,890,166, Cl. 358-228.000.
Takebe, Kaoru, to Minolta Camera Kabushiki Kaisha. Image forming apparatus. 4,890,139, Cl. 355-268.000.
Takeda, Akihiko; Kaneda, Hiroyuki; and Suzuki, Shigeru, to Honda Giken Kogyo Kabushiki Kaisha. Cylinder head cooling structure for water-cooled multicylinder engine. 4,889,079, Cl. 123-41.82R.
Takeda Chemical Industries, Ltd.: *See*—
Inoue, Keizo; Nomura, Hiroaki; and Okutani, Tetsuya, 4,889,953, Cl. 564-293.000.
Takeda, Hisami: *See*—
Ohtsubo, Toshiro; Tsuda, Shigenori; Manabe, Yukio; Kasamatsu, Kiyoshi; Takeda, Hisami; and Tsuji, Kozo, 4,889,719, Cl. 424-408.000.
Takeda, Kazuhisa: *See*—
Kim, Soonih; Takeda, Kazuhisa; and Sasatani, Seiei, 4,889,723, Cl. 424-450.000.
Takeda, Mamoru: *See*—
Yamashita, Ichiro; and Takeda, Mamoru, 4,890,097, Cl. 340-719.000.
Takeda, Ryuzaburo; Koizumi, Hideaki; and Miyamoto, Yoshiyuki, to Hitachi, Ltd. Nuclear magnetic resonance imaging apparatus. 4,889,127, Cl. 128-653.000.
Takehana, Tsutomu; Kouzai, Tetsuo; Sagara, Masaaki; Yaginuma, Tamio; and Sasaki, Teruji, to Coca-Cola Company, The. Apparatus for producing bottled beverages. 4,888,936, Cl. 53-510.000.
Takei, Akira; Nabeta, Teruyuki; Nishikawa, Tetsuo; and Nagai, Eiichi, to Fujitsu Limited. Image sensor having charge storage regions. 4,890,164, Cl. 358-213.190.
Takei, Hisashi; Ohmura, Hiroshi; Ushiro, Seimei; Mochida, Mitsuyoshi; Nakamura, Yoshihiko; Asano, Seiji; and Yoshida, Toshio, to Fuji Photo Film Co., Ltd. Lens-fitted photographic film package. 4,890,130, Cl. 354-288.000.
Takenaka, Masamitsu: *See*—
Wada, Tatsuo; Miki, Toshiro; and Takenaka, Masamitsu, 4,889,584, Cl. 156-630.000.
Takenouchi, Toshikazu: *See*—
Miyagawa, Fumio; Sakai, Hiroyuki; and Takenouchi, Toshikazu, 4,890,155, Cl. 357-74.000.
Takeuchi, Tomio: *See*—
Machinami, Tomoya; Nakamura, Takeshi; Nishihata, Ken; Kondo, Shinichi; and Takeuchi, Tomio, 4,889,926, Cl. 536-6.400.
Takeuchi, Toyoaki; and Ikeda, Yoshiaki, to Olympus Optical Co., Ltd. Optical information recording/reproducing system with variable gain servo error correction in response to detected track formats. 4,890,273, Cl. 369-45.000.
Taki, Masakazu: *See*—
Nishimae, Junichi; Yoshizawa, Kenji; Taki, Masakazu; Ueda, Yoshihiro; Yanagi, Tadashi; and Iwata, Akihiko, 4,890,294, Cl. 372-57.000.
Takimoto, Masahiro, to Toyoda Gosei Co., Ltd. Process for preparing polyvinyl chloride material used for extrusion molding. 4,889,673, Cl. 264-118.000.
Tamba, Shinichi: *See*—
Fujikawa, Tetsuzo; Hirata, Makizo; and Tamba, Shinichi, 4,889,089, Cl. 123-195.0HC.
Tamblyn, Charles C.; and Forde, Philip L., to American & Overseas Corporation. Retractable truck bed cover apparatus. 4,889,381, Cl. 296-98.000.

Tamura, Hidemasa: *See*—
Uedaira, Satoru; Suzuki, Masayuki; Yamanoi, Hiroshi; and Tamura, Hidemasa, 4,889,706, Cl. 423-593.000.

Tan, Raul V.: *See*—
Ausschnitt, Christopher P.; McFadden, Edward A.; and Tan, Raul V., 4,890,239, Cl. 364-491.000.

Tanahashi, Hiroshi: *See*—
Tazawa, Toshiaki; Yotsumoto, Masahiro; Tanahashi, Hiroshi; and Wakabayashi, Yuzuru, 4,889,743, Cl. 426-495.000.

Tanaka, Fuminari; and Nonaka, Satoshi, to Kabushiki Kaisha Toshiba. Output circuit for CMOS integrated circuit with pre-buffer to reduce distortion of output signal. 4,890,016, Cl. 307-443.000.

Tanaka, Kunio; and Onishi, Yasushi, to Fanuc Ltd. NC data modification method. 4,890,234, Cl. 364-474.230.

Tanaka, Mikio: *See*—
Inoue, Hajime; and Tanaka, Mikio, 4,890,168, Cl. 358-335.000.

Taneya, Mototaka; Takahashi, Kosei; Hayakawa, Toshiro; Matsui, Sadayoshi; Matsumoto, Mitsuhiro; and Hosoba, Hiroyuki, to Sharp Kabushiki Kaisha. Semiconductor laser device. 4,890,293, Cl. 372-46.000.

Tang, Thomas E.; Wei, Che-Chia; Haken, Roger A.; and Chapman, Richard A., to Texas Instruments Incorporated. CMOS device with both p+ and n+ gates. 4,890,141, Cl. 357-23.300.

Taniguchi, Masaharu; Tokunow, Masazumi; and Fujikawa, Junichi, to Toray Industries, Inc. Photosensitive polymer composition containing an ethylenically unsaturated compound and a polyamide or polyesteramide. 4,889,793, Cl. 430-284.000.

Taniguchi, Takashi: *See*—
Fujiwara, Tadayoshi; Yamaoka, Yukio; Hamada, Kazuichi; Yamada, Yoshiro; Kawaguchi, Yasunobu; Oki, Yasuhiro; Taniguchi, Takashi; and Takahashi, Hiroyuki, 4,889,567, Cl. 148-12.00B.

Taniguchi, Tomohiko; Iseda, Kohei; Okazaki, Koji; Amano, Fumio; and Unagami, Shigeyuki, to Fujitsu Limited. Speech coding transmission equipment. 4,890,325, Cl. 381-34.000.

Tanihara, Masao; Oka, Kiichiro; Yamada, Hideaki; Kobayashi, Akira; Nakashima, Toshihide; Omura, Yoshiaki; and Takakura, Koichi, to Agency of Industrial Science Technology, Ministry of International Trade & Industry. Peptide. 4,889,917, Cl. 530-324.000.

Tanikawa, Keiichi: *See*—
Higaki, Yuzo; Goto, Hiroyuki; and Tanikawa, Keiichi, 4,889,648, Cl. 252-49.500.

Tanimoto, Yoshio: *See*—
Takao, Hiroyoshi; Tanimoto, Yoshio; and Ikeda, Kiyosi, 4,889,881, Cl. 524-91.000.

Tanoshima, Katsuhide; and Nagasawa, Hikoshi, to Electric Industry Co., Ltd. Electronic dictionary. 4,890,230, Cl. 364-419.000.

Tarpai, Gyula: *See*—
Balogh, Karoly; Dombay, Zsolt; Fodor, Karoly; Grega nee Toth, Erzebet; Lorik, Erno ; Magyar nee Tomorkenyi, Magdolna; Nagy, Jozsef; Pasztor, Karoly; Santha, Pal; Tarpai, Gyula; Toth, Istvan; and Urszin nee Simon, Eszter, 4,889,944, Cl. 558-171.000.

Tate & Lyle Public Limited Company: *See*—
Simpson, Philip J., 4,889,928, Cl. 536-122.000.

Tateishi, Kiyoshi, to Pioneer Electronic Corporation. Carriage driving apparatus for a disk player. 4,890,277, Cl. 369-219.000.

Tateno, Atsushi; and Mashiko, Kimio, to Japan Tobacco Inc. Filter for tobacco smoking. 4,889,144, Cl. 131-337.000.

Tatsuno, Isamu, to Mont-Bell Co., Ltd. Sleeping bag device. 4,888,828, Cl. 2-69.500.

Tatsuoka, Toshio; Suzuki, Kenji; Satoh, Fumio; Miyano, Seiji; and Sumoto, Kunihiro, to Suntory Limited. Hydroquinonlyphenyl butyric acid amide derivative. 4,889,853, Cl. 514-227.500.

Taube, John C., to Phospho Energetics, Inc. Adaptive control of neonatal fractional inspired oxygen. 4,889,116, Cl. 128-204.230.

Taubitz, Christof: *See*—
Barzynski, Helmut; Benthack-Thomas, Heidi; Hellwig, Karl-Ruediger; and Taubitz, Christof, 4,889,756, Cl. 428-64.000.

Taylor, Brian W., to British Aerospace, PLC. Lock nut assemblies. 4,889,458, Cl. 411-383.000.

Taylor, David B.; and Zemke, Steven C., to Hewlett-Packard Company. RFI shielding gasket. 4,889,959, Cl. 174-35.0GC.

Taylor, Edward C.; and Shih, Chuan, to Princeton University, The Trustees of. Pyrido[2,3-d]pyrimidine derivatives. 4,889,859, Cl. 514-258.000.

Tazawa, Toshiaki; Yotsumoto, Masahiro; Tanahashi, Hiroshi; and Wakabayashi, Yuzuru, to Suntory Limited; and Kansai Chemical engineering Co., Ltd. Method for continuous tartar separation. 4,889,743, Cl. 426-495.000.

Tazmo Co., Ltd.: *See*—
Kawakami, Kazushi, 4,889,069, Cl. 118-50.000.

TDK Corporation: *See*—
Kawaguchi, Yukio; and Kineri, Tobru, 4,890,087, Cl. 338-22.00R.
Ono, Shuichi; Itagaki, Shuichi; and Yahagi, Masahiro, 4,889,837, Cl. 501-139.000.
Yokoyama, Kenji; Nakayama, Masatoshi; Shimozawa, Toru; Ueda, Kunihiro; and Maruta, Fumio, 4,889,767, Cl. 428-336.000.

TDK Electronic Co., Ltd.: *See*—
Saito, Kiyokazu; and Imaizumi, Hiraku, 4,890,085, Cl. 336-192.000.

Teach, Ted L.: *See*—
Studebaker, Robert H.; Teach, Ted L.; and Kidwell, Michael H., 4,888,890, Cl. 37-103.000.

Technoplas Inc.: *See*—
Kojima, Hisashi; and Miyagi, Tatsuo, 4,889,667, Cl. 264-40.100.

Tecumseh Products Company: *See*—
Gannaway, Edwin L.; and Ortiz, Arturo L., 4,889,475, Cl. 417-350.000.
Harper, Harold M.; and Holtman, Mark C., 4,888,962, Cl. 62-503.000.
Roller, Lee E., 4,889,213, Cl. 192-1.440.

Tegal Corporation: *See*—
Fior, Gianni O., 4,889,588, Cl. 156-643.000.

Teikoku Seiyaku Kabushiki Kaisha: *See*—
Konishi, Ryoji, 4,889,720, Cl. 424-448.000.

Tektronix, Inc.: *See*—
Allsop, Bryan E.; Mabbitt, Allen W.; and Smith, Kevin K., 4,889,985, Cl. 250-214.00A.
Baker, Daniel G.; Cooper, William J.; and Penney, Bruce J., 4,890,158, Cl. 358-10.000.
Bales, Robert W.; and Olson, Lynn T., 4,890,237, Cl. 364-485.000.
Jaeger, Charles W.; Titterington, Donald R.; Le, Hu P.; and Sopko, Jeffrey J., 4,889,560, Cl. 106-27.000.
Lamb, James S., 4,890,067, Cl. 330-149.000.
Stein, William W.; and Miller, Lawrence J., 4,889,573, Cl. 156-89.000.
Titterington, Donald R.; Anderson, Jeffrey J.; Rise, James D.; and Jaeger, Wayne, 4,889,761, Cl. 428-195.000.

Tel Sagami Limited: *See*—
Nakamaki, Shin; and Sasahara, Yuzuru, 4,888,994, Cl. 73-760.000.

Teledyne MEC: *See*—
Sun, Horng-Jye, 4,890,077, Cl. 333-81.00A.

Telefonaktiebolaget L M Ericsson: *See*—
Hedberg, Bo G., 4,890,301, Cl. 375-60.000.

Telefus, Mark. Switching mode power supply start-up circuit. 4,890,211, Cl. 363-37.000.

Temple, Roger C., to Alvado, Joseph D. Surge brake. 4,889,212, Cl. 188-112.00R.

Templeton, Kenly & Co.: *See*—
Decker, Arnold F.; and Silke, Timothy L., 4,889,472, Cl. 417-46.000.

Temporary Windows, Inc.: *See*—
Vargas, Ky, 4,889,754, Cl. 428-41.000.

Teng, Clarence W.; and Haken, Roger A., to Texas Instruments Incorporated. Through-field implant isolated devices and method. 4,890,147, Cl. 357-23.110.

Teng, Ker-Wen; Wang, Karl L.; Nguyen, Bich-Yen; and Wu, Wei, to Motorola, Inc. Integrated circuit trench cell. 4,890,144, Cl. 357-23.400.

Tennikova, Tatiana B.: *See*—
Svec, Frantisek; Bleha, Miroslav; Tennikova, Tatiana B.; and Belenkii, Boris G., 4,889,632, Cl. 210-500.280.

Tenniswood, David M.: *See*—
Pea, Kevin I.; Tenniswood, David M.; and Loeck, Steven M., 4,889,964, Cl. 200-31.00R.

Terahata, Masahiro, to Fuji Photo Film Co., Ltd. Method of changing the density of image on simple color proof using a randomly dotted half tone mask. 4,889,794, Cl. 430-293.000.

Terbrack, Ulrich: *See*—
Siol, Werner; and Terbrack, Ulrich, 4,889,894, Cl. 525-227.000.

Ter Kuile, Willem M.: *See*—
Van Veen, Jacobus J. F.; Konig, Johan W.; Ter Kuile, Willem M.; and Van Dijk, Cornelis, 4,889,427, Cl. 356-445.000.

Terrell, Donna P.: *See*—
Terrell, Jamie B.; Terrell, Donna P.; and Parks, Setella, 4,889,187, Cl. 166-298.000.

Terrell, Donna Pratt: *See*—
Terrell, Jamie B.; Terrell, Donna P.; and Parks, Setella, 4,889,187, Cl. 166-298.000.

Terrell, Jamie B.; Terrell, Donna P.; and Parks, Setella, to Terrell, Jamie Bryant; and Terrell, Donna Pratt. Multi-run chemical cutter and method. 4,889,187, Cl. 166-298.000.

Terrell, Jamie Bryant: *See*—
Terrell, Jamie B.; Terrell, Donna P.; and Parks, Setella, 4,889,187, Cl. 166-298.000.

Teshima, Shinichi, to Asahi Kasei Kogyo Kabushiki Kaisha. Plastic optical fiber less attenuating light and process for producing the same. 4,889,408, Cl. 350-96.340.

Teva Pharmaceutical Industries Ltd.: *See*—
Kasan, Rodney; Seiffe, Michael; and Yellin, Haim, 4,889,724, Cl. 424-649.000.

Tew, Dennis: *See*—
Crossan, Jimmey; Maynard, Buford; and Tew, Dennis, 4,889,214, Cl. 192-17.00R.

Texaco Inc.: *See*—
Beaupre, Richard F., 4,889,541, Cl. 55-16.000.
Jahnke, Frederick C., 4,889,657, Cl. 252-373.000.
Najjar, Mitri S., 4,889,658, Cl. 252-373.000.
Najjar, Mitri S.; and Becker, Michael W., 4,889,699, Cl. 423-210.000.

Texas Instruments Incorporated: *See*—
Chatterjee, Pallab K., 4,889,832, Cl. 437-203.000.
Darley, Henry M., 4,890,127, Cl. 364-786.000.
Derryberry, Lesli A.; and Williams, Charles E., 4,890,194, Cl. 361-386.000.
Hashimoto, Masashi; and Tachibana, Tadashi, 4,890,262, Cl. 365-200.000.
Hellums, James R., 4,890,052, Cl. 323-315.000.
Malhi, Satwinder S., 4,890,145, Cl. 357-23.600.
Ramsey, Thomas H., 4,889,274, Cl. 228-179.000.

Tang, Thomas E.; Wei, Che-Chia; Haken, Roger A.; and Chapman, Richard A., 4,890,141, Cl. 357-23.300.
Teng, Clarence W.; and Haken, Roger A., 4,890,147, Cl. 357-23.110.
Trenkler, George; Delagi, Richard G.; Padovani, Francois A.; and Winslow, Donald L., 4,890,083, Cl. 335-301.000.
Wilson, Arthur M., 4,890,157, Cl. 357-80.000.
Wise, Janet L., 4,890,015, Cl. 307-443.000.

Tezuka, Nobuo, to Canon Kabushiki Kaisha. Recording medium mounting means and recording or reproducing apparatus incorporating same. 4,890,175, Cl. 360-97.010.

Thalmann, Ernest H.: *See*—
Eager, George S., Jr.; Fryszczyn, Bogdan; and Thalmann, Ernest H., 4,888,886, Cl. 34-104.000.

Thermalloy Incorporated: *See*—
Hinshaw, Howard G., 4,890,196, Cl. 361-388.000.

Thermo Blender Inc.: *See*—
Bennett, James R., 4,889,248, Cl. 215-100.00R.

Thermo Electron Web Systems, Inc.: *See*—
Goodnow, Ronald F., 4,889,035, Cl. 91-275.000.

Thermo King Corporation: *See*—
Brown, Ronald W., 4,888,959, Cl. 62-244.000.

Thetford Corporation: *See*—
Cameron, David B., 4,888,832, Cl. 4-321.000.

Thibault, Joseph A.: *See*—
Weaver, Kim A.; Jones, James M.; and Thibault, Joseph A., 4,889,149, Cl. 137-1.000.

Thomas, Anthony T.: *See*—
Rigby, William R.; Furneaux, Robin C.; and Thomas, Anthony T., 4,889,631, Cl. 210-493.100.

Thomas, Erwin: *See*—
Fuchs, Hugo; Ritz, Josef; Thomas, Erwin; and Weiss, Franz-Josef, 4,889,704, Cl. 423-387.000.

Thomas, Gilles: *See*—
Tonnel, Eugene; and Thomas, Gilles, 4,890,142, Cl. 357-23.400.

Thomas, Glenn R.: *See*—
McKee, Jere L.; Beatty, William E., Jr.; and Thomas, Glenn R., 4,890,081, Cl. 335-18.000.

Thomas, Graham A., to British Broadcasting Corporation. TV picture motion vector measurement by correlation of pictures. 4,890,160, Cl. 358-105.000.

Thompson, Douglas K., to General Motors Corporation. Secondary oil system. 4,888,947, Cl. 60-39.080.

Thompson, Ronald J.: *See*—
Gurak, Nur R.; Thompson, Ronald J.; Russell, James P.; and Yarkovsky, Joseph M., 4,889,670, Cl. 264-50.000.

Thompson, Steven C. Disposable uniform wire stripper. 4,889,019, Cl. 81-9.400.

Thomson-CSF: *See*—
Jenahim, Guy; Dutaut, Jean-Michel; and Giraudon, Jean-Claude, 4,890,070, Cl. 330-296.000.
Genevieve, Deville, 4,890,189, Cl. 361-222.000.

Thomson, David L.: *See*—
Prezas, Dimitrios P.; and Thomson, David L., 4,890,328, Cl. 381-38.000.

Thorez, Alain: *See*—
Besson, Bernard; Kalck, Philippe; and Thorez, Alain, 4,889,957, Cl. 568-454.000.

Thorn, Richard P.: *See*—
Flower, Wallace C.; and Thorn, Richard P., 4,889,325, Cl. 267-140.100.

Thornfeldt, Carl R.; and Thornfeldt, Robert E. Treatment of colic and teething. 4,889,850, Cl. 514-221.000.

Thornfeldt, Robert E.: *See*—
Thornfeldt, Carl R.; and Thornfeldt, Robert E., 4,889,850, Cl. 514-221.000.

Thorson, Lewis D.: *See*—
Hanson, Merle E.; and Thorson, Lewis D., 4,889,186, Cl. 166-252.000.

Thrall Car Manufacturing Company: *See*—
Jamrozy, Richard E.; and Wilczynski, James M., 4,889,055, Cl. 105-355.000.

Thrash, Robert J.: *See*—
Connolly, John F.; and Thrash, Robert J., 4,889,779, Cl. 429-196.000.

Thurston, Marlin O.: *See*—
Ramsey, Raymond C.; and Thurston, Marlin O., 4,889,991, Cl. 250-336.100.

Tice, Janell. Skin lotion dispenser and applicator. 4,889,441, Cl. 401-131.000.

Tikka, Panu; and Virkola, Nils E., to Oy Advanced Forest Automation Ab. Method of determining rapidly the concentration of the total sulphur dioxide and the lignosulphonate present in sulphite pulping process liquors. 4,889,593, Cl. 162-49.000.

Timmons, Michael B.; and Kreher, Neal B., to Cornell Research Foundation, Inc. Processed egg product. 4,889,741, Cl. 426-614.000.

Tinebor, Manfred: *See*—
Karl, Heinz-Dietmar; Tinebor, Manfred; and Lackhove, Josef, 4,890,185, Cl. 361-91.000.

Tiroux, Josef: *See*—
Aust, Aloys; Tiroux, Josef; and Weissenfels, Franz, 4,889,875, Cl. 521-123.000.

Titterington, Donald R.; Anderson, Jeffrey J.; Rise, James D.; and Jaeger, Wayne, to Tektronix, Inc. Substrates having a light-transmissive phase change ink printed thereon and methods for producing same. 4,889,761, Cl. 428-195.000.

Titterington, Donald R.: *See*—
Jaeger, Charles W.; Titterington, Donald R.; Le, Hu P.; and Sopko, Jeffrey J., 4,889,560, Cl. 106-27.000.

Tkatchenko, Igor: *See*—
Grenouillet, Pierre; Neibecker, Denis; and Tkatchenko, Igor, 4,889,949, Cl. 560-202.000.

TLV Co., Ltd.: *See*—
Yumoto, Hideaki; Yonemura, Masao; and Yamada, Yoshito, 4,888,978, Cl. 73-40.000.

Toa Nenryo Kogyo, K.K.: *See*—
Yoshimura, Narihiko; Tomizawa, Hirotaka; and Komatsu, Yasuji, 4,889,650, Cl. 252-79.000.

Toagosei Chemical Industry Co., Ltd.: *See*—
Wada, Tatsuo; Miki, Toshiro; and Takenaka, Masamitsu, 4,889,584, Cl. 156-630.000.

Todd, Barry A. H., to Fin Sports Limited. Racquet shock absorbing device. 4,889,337, Cl. 273-73.00D.

Todo, Eishiro: *See*—
Oku, Teruo; Todo, Eishiro; Kasahara, Chiyoshi; Nakamura, Katsuya; and Kayakiri, Hiroshi, 4,889,851, Cl. 514-223.200.

Toelle, Hans-Juergen: *See*—
Nerowski, Georg; Piepenbreier, Bernhard; and Toelle, Hans-Juergen, 4,890,181, Cl. 361-18.000.

Toft, Nils, to Generaldirektoratet for Danske Statsbaner, DSB, and Jens Moller-Jensen. Light transmitting plate member. 4,890,201, Cl. 362-31.000.

Toida, Yoichi: *See*—
Marumo, Chihiro; Toida, Yoichi; Nemoto, Masatsugu; Iida, Junichi; and Sakuma, Kenji, 4,888,984, Cl. 73-105.000.

Toji, Shigeo: *See*—
Ogawa, Ryota; Toji, Shigeo; Yoshida, Kazushi; and Okura, Zenichi, 4,890,133, Cl. 354-402.000.

Tokarz, Joseph S.: *See*—
Metz, Michael; Tokarz, Joseph S.; and Jensen, Marvin E., 4,889,532, Cl. 604-330.000.

Tokita, Akihiko: *See*—
Akasaki, Yutaka; Tokita, Akihiko; Torikoshi, Kaoru; Imai, Akira; and Ishii, Touru, 4,889,924, Cl. 534-658.000.

Tokuda, Masamori: *See*—
Higashi, Kazutada; Tokuda, Masamori; Nakano, Hiroshi; and Ohta, Tomozo, 4,890,076, Cl. 332-170.000.

Tokunow, Masazumi: *See*—
Taniguchi, Masaharu; Tokunow, Masazumi; and Fujikawa, Junichi, 4,889,793, Cl. 430-284.000.

Tokushu Shikiryo Color & Chemical Inc.: *See*—
Uchiyama, Akira; and Okamoto, Katsuo, 4,889,762, Cl. 428-195.000.

Tokyo Aircraft Instrument Co., Ltd.: *See*—
Nakamura, Shuji, 4,890,103, Cl. 340-968.000.

Tokyo Sen-I Kogyo Co., Ltd.: *See*—
Onai, Kozo, 4,889,963, Cl. 174-129.00R.

Tolman, Richard L.; Wagner, Arthur F.; Baldwin, John J.; and Pietruszkiewicz, Adolph, to Merck & Co., Inc. 7,8-dihydro-4-(1-pierazinyl)-6H-thiopyrano-[3,2-d] pyrimidines as β-blockers. 4,889,856, Cl. 514-254.000.

Tomikawa, Minato: *See*—
Inuzuka, Toshio; Hasegawa, Tsutomu; Tomikawa, Minato; and Aoki, Shigeru, 4,889,766, Cl. 428-324.000.

Tomiolo, Andrea, to Carpio S.r.l. Process and device for measuring and processing the displacements between two or more points in structures, buildings, machinery or the like. 4,889,997, Cl. 250-561.000.

Tomisawa, Naoki: *See*—
Nakaniwa, Shinpei; Otani, Seiichi; Hamada, Toru; Osaki, Masanobu; Hoshino, Yukio; and Tomisawa, Naoki, 4,889,100, Cl. 123-492.000.

Tomishawa, Naoki, to Japan Electronic Control Systems Company, Limited. Air/fuel mixture ratio control system for internal combustion engine with feature of learning correction coefficient including altitude dependent factor. 4,889,099, Cl. 123-489.000.

Tomiya, Seisuke: *See*—
Hashimoto, Takatsugu; and Tomiya, Seisuke, 4,889,677, Cl. 264-297.500.

Tomizawa, Hirotaka: *See*—
Yoshimura, Narihiko; Tomizawa, Hirotaka; and Komatsu, Yasuji, 4,889,650, Cl. 252-79.000.

Toms, Ray A., to L'Oreal, S. A. Locking system for pump dispenser. 4,889,262, Cl. 222-153.000.

Toncelli, Dario. Conveyor belt with projections inclined in the opposite direction. 4,889,227, Cl. 198-699.100.

Tonnel, Eugene; and Thomas, Gilles, to SGS-Thomson Microelectronics S.A. Power MOS transistor structure. 4,890,142, Cl. 357-23.400.

Toray Industries: *See*—
Kobayashi, Hirokazu; and Kishimoto, Akihiko, 4,889,893, Cl. 525-189.000.

Toray Industries, Inc.: *See*—
Taniguchi, Masaharu; Tokunow, Masazumi; and Fujikawa, Junichi, 4,889,793, Cl. 430-284.000.

Toray Silicone Company Limited: *See*—
Ona, Isao; Naganawa, Tsutomu; Suzuki, Toshio; and Okawa, Tadashi, 4,889,770, Cl. 428-447.000.
Suganuma, Noriyuki; and Shimmi, Hideo, 4,889,576, Cl. 156-249.000.
Suzuki, Toshio, 4,889,905, Cl. 528-30.000.

Torii, Shumpeita, to Fuji Photo Film Co., Ltd. Cassette for stimulable phosphor sheet. 4,889,233, Cl. 206-455.000.

Torii, Shumpeita: *See*—
Yoshimura, Ryoichi; Torii, Shumpeita; and Yamada, Naoto, 4,889,989, Cl. 250-327.200.
Torikoshi, Kaoru: *See*—
Akasaki, Yutaka; Tokita, Akihiko; Torikoshi, Kaoru; Imai, Akira; and Ishii, Touru, 4,889,924, Cl. 534-658.000.
Toshiba Kikai K. K.: *See*—
Sato, Kazuhito, 4,889,478, Cl. 425-149.000.
Toth, Istvan: *See*—
Balogh, Karoly; Dombay, Zsolt; Fodor, Karoly; Grega nee Toth, Erzebet; Lorik, Erno ; Magyar nee Tomorkenyi, Magdolna; Nagy, Jozsef; Pasztor, Karoly; Santha, Pal; Tarpai, Gyula; Toth, Istvan; and Urszin nee Simon, Eszter, 4,889,944, Cl. 558-171.000.
Tovel Manufacturing Limited: *See*—
Bentivoglio, Giovanni, 4,889,038, Cl. 92-110.000.
Toyoda Gosei Co., Ltd.: *See*—
Takimoto, Masahiro, 4,889,673, Cl. 264-118.000.
Toyoda Machine Works, Ltd.: *See*—
Noda, Shigeo, 4,890,306, Cl. 377-15.000.
Toyokawa, Yasufumi: *See*—
Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; and Takahashi, Satoru, 4,889,552, Cl. 71-92.000.
Toyota Jidosha Kabushiki Kaisha: *See*—
Iwata, Yasuo; Mae, Shigenori; Urai, Yoshio; and Tsunoda, Takayuki, 4,889,557, Cl. 75-249.000.
Izawa, Minoru; Hamamoto, Tadanao; Ishikawa, Masaru; Dohke, Harumi; and Nakano, Tasuku, 4,890,037, Cl. 315-77.000.
Trabitzsch, Uwe: *See*—
Amberg, Guenther; Bechstedt, Wolfgang; Schulz, Paul; and Trabitzsch, Uwe, 4,889,644, Cl. 252-8.900.
Traenckner, Hans-Joachim: *See*—
Pielartzik, Harald; Ebert, Wolfgang; Meyer, Rolf-Volker; Traenckner, Hans-Joachim; and Ostlinning, Edgar, 4,889,911, Cl. 528-182.000.
Trahan, Albert J.; and Douglas, Robert J., to Emhart Industries, Inc. Plunger operating mechanism for a glass forming machine. 4,889,549, Cl. 65-314.000.
Translift Systems, Inc.: *See*—
Self, F. Wayne, 4,889,464, Cl. 414-491.000.
Tranter, Brian R., to EG&G Limited. Bellows seal arrangement. 4,889,350, Cl. 277-88.000.
Trees, George M.: *See*—
Anthias, Tefcros; Herrod, John A.; and Trees, George M., 4,890,257, Cl. 364-900.000.
Trenkler, George; Delagi, Richard G.; Padovani, Francois A.; and Winslow, Donald L., to Texas Instruments Incorporated. Shhielding material and shielded room. 4,890,083, Cl. 335-301.000.
Trenkler, Gerhard; Wedekind, Reinhard; and Maier, Reinhard, to Siemens Aktiengesellschaft. Arrangement for measuring the slip of electric induction motors. 4,890,058, Cl. 324-158.0MG.
Trimble, Brent J. Composite bicycle frames and methods of making same. 4,889,355, Cl. 280-281.100.
Trinity Industries, Inc.: *See*—
Stewart, Thomas, 4,889,056, Cl. 105-377.000.
Trion Industries, Inc.: *See*—
Glickman, Joel I.; and Pflug, Robert F., 4,889,304, Cl. 248-222.100.
Trotter, Ansel B., Sr. Water collection mat for dish-washers. 4,889,155, Cl. 137-312.000.
Trouve, Patrick: *See*—
Seinera, Henry; Luberne, Patricia; Stock, Claude; and Trouve, Patrick, 4,889,879, Cl. 524-13.000.
Trujillo, Ruben: *See*—
Felker, Michael A.; Viverito, Angelo N.; Gilstrap, John W.; Martos, Jesus J.; Trujillo, Ruben; and Wang, Chang J., 4,890,278, Cl. 370-17.000.
Trumbull, Douglas, to Showscan Film Corporation. Conversion of high to low frame rate motion picture films. 4,889,423, Cl. 352-46.000.
Tsai, Chee-Hway: *See*—
Powers, John R.; Stipp, Gordon K.; Strobel, Rudolf G. K.; and Tsai, Chee-Hway, 4,889,739, Cl. 426-599.000.
Tsang, Paul: *See*—
Johnson, Bruce E.; and Tsang, Paul, 4,890,287, Cl. 371-37.200.
Tsao, Fupao, to Ciba-Geigy Corporation. Method of disinfecting a soft contact lens with a diethylene triamine penta(methylenephosphonic acid) stabilized hydrogen peroxide solution. 4,889,689, Cl. 422-30.000.
Tsaur, Bor-Yeu: *See*—
Chen, Chenson K.; and Tsaur, Bor-Yeu, 4,889,583, Cl. 156-604.000.
Tsinberg, Mikhail; and Otto, Detlev, to North American Philips Corporation. High definition television augmentation channel. 4,890,283, Cl. 370-84.000.
Tsubaki, Tohru, to Hitachi, Ltd. Gas-insulated switchgear equipment. 4,890,193, Cl. 361-341.000.
Tsuchikura, Kaname: *See*—
Ichinomiya, Keizi; Okada, Kouichi; Itsuki, Yuji; and Tsuchikura, Kaname, 4,890,033, Cl. 313-487.000.
Tsuchiya, Hiroyoshi: *See*—
Nakazato, Katsuo; Tsuchiya, Hiroyoshi; Kurosawa, Toshiharu; Maruyama, Yuji; and Takahashi, Kiyoshi, 4,890,167, Cl. 358-443.000.
Tsuchiya, Shozo; Aoki, Nobuo; and Suzuki, Shinichiro, to Nippon Oil Co., Ltd. Positive type photoresist material. 4,889,791, Cl. 430-270.000.
Tsuda, Shigenori: *See*—
Ohtsubo, Toshiro; Tsuda, Shigenori; Manabe, Yukio; Kasamatsu, Kiyoshi; Takeda, Hisami; and Tsuji, Kozo, 4,889,719, Cl. 424-408.000.
Tsugawa, Iwao: *See*—
Utsumi, Kenichi; Yuasa, Tetsuya; Goto, Yasuyuki; Tsugawa, Iwao; and Koshino, Nagaaki, 4,889,746, Cl. 427-162.000.
Tsugei, Shinji; Iguchi, Shigeki; and Inoue, Tomohiro, to Sharp Kabushiki Kaisha. Schedule setting method. 4,890,258, Cl. 364-900.000.
Tsuji, Kozo: *See*—
Ohtsubo, Toshiro; Tsuda, Shigenori; Manabe, Yukio; Kasamatsu, Kiyoshi; Takeda, Hisami; and Tsuji, Kozo, 4,889,719, Cl. 424-408.000.
Tsujimura, Shinichirou: *See*—
Fujikawa, Shouji; Araki, Masakatsu; Kumano, Fumihiro; and Tsujimura, Shinichirou, 4,888,870, Cl. 30-233.500.
Tsunoda, Noriaki: *See*—
Takagi, Hiroshi; Serikawa, Toshiaki; and Tsunoda, Noriaki, 4,889,442, Cl. 401-194.000.
Tsunoda, Takayuki: *See*—
Iwata, Yasuo; Mae, Shigenori; Urai, Yoshio; and Tsunoda, Takayuki, 4,889,557, Cl. 75-249.000.
Tsunotani, Masanori: *See*—
Saito, Tadashi; Nakamura, Hiroshi; and Tsunotani, Masanori, 4,889,817, Cl. 437-22.000.
Tsunoyama, Kozo: *See*—
Okada, Susumu; Imanaka, Makoto; Masui, Susumu; Obara, Takashi; Shinozaki, Masatoshi; and Tsunoyama, Kozo, 4,889,566, Cl. 148-2.000.
Tsutsui, Kiyomi: *See*—
Yamaoka, Masayoshi; Tsutsui, Kiyomi; Inoue, Tadashi; and Takahashi, Toyoki, 4,888,993, Cl. 73-760.000.
Tsutsumi, Yoshitsugu; Ueda, Shinjiro; and Otaka, Tadashi, to Hitachi, Ltd. Apparatus for analysis employing electron. 4,889,995, Cl. 250-441.100.
Tucker, Dalton R. Drinking container holder. 4,889,302, Cl. 248-146.000.
Tucker, Robert L.; and Staller, Joseph M., to Motorola Inc. Semiconductor pressure sensor means and method. 4,889,590, Cl. 156-647.000.
Tyree, Lewis, Jr.; Gyger, Roger F.; and Rhoades, George D., to Liquid Carbonic Corporation. Two phase CO_2 storage tank. 4,888,955, Cl. 62-47.100.
Tyson, William H., Jr.; and Stuart, Frank A. Treatment of catalyst fines-oil mixtures. 4,889,618, Cl. 208-162.000.
Tzeng, Yew-Min: *See*—
Diosady, Levente L.; Rubin, Leon J.; and Tzeng, Yew-Min, 4,889,921, Cl. 530-377.000.
Ube Industries, Ltd.: *See*—
Kawamura, Hirotaka; Ohtsu, Norio; and Utiumi, Shinichiro, 4,889,943, Cl. 558-71.000.
Uchiyama, Akira; and Okamoto, Katsuo, to Mitsui Petrochemical Industries Ltd.; and Tokushu Shikiryo Color & Chemical Inc. Molded articles of thermoplastic elastomer. 4,889,762, Cl. 428-195.000.
Uda, Masahiro; Ohno, Satoru; and Okuyama, Hideo, to National Research Institute for Metals. Process for producing ultrafine particles of ceramics. 4,889,665, Cl. 264-10.000.
Ude, Werner: *See*—
Besecke, Sigmund; Knebel, Joachim; Schroeder, Guenter; and Ude, Werner, 4,889,909, Cl. 528-125.000.
Ueberreiter, Ekkehard: *See*—
Willberg, Hans H.; and Ueberreiter, Ekkehard, 4,889,242, Cl. 209-573.000.
Ueda, Ken: *See*—
Umetani, Keiji; Ueda, Ken; Suzuki, Ryuichi; and Yokouchi, Hisatake, 4,890,310, Cl. 378-82.000.
Ueda, Kunihiro: *See*—
Yokoyama, Kenji; Nakayama, Masatoshi; Shimozawa, Toru; Ueda, Kunihiro; and Maruta, Fumio, 4,889,767, Cl. 428-336.000.
Ueda, Shinjiro: *See*—
Tsutsumi, Yoshitsugu; Ueda, Shinjiro; and Otaka, Tadashi, 4,889,995, Cl. 250-441.100.
Ueda, Yoshihiro: *See*—
Nishimae, Junichi; Yoshizawa, Kenji; Taki, Masakazu; Ueda, Yoshihiro; Yanagi, Tadashi; and Iwata, Akihiko, 4,890,294, Cl. 372-57.000.
Ueda, Yoshio; Asakura, Sotoo; Murakami, Yoshio; and Nakate, Toshiomi, to Fujisawa Pharmaceutical Co., Ltd. Sustained-release percutaneous preparations. 4,889,721, Cl. 424-448.000.
Uedaira, Satoru; Suzuki, Masayuki; Yamanoi, Hiroshi; and Tamura, Hidemasa, to Sony Corporation. Method of manufacturing fine powder of lead stannate. 4,889,706, Cl. 423-593.000.
Uehara, Makoto: *See*—
Yomoto, Masahiko; Uehara, Makoto; Ichikawa, Hajime; and Kato, Shigeru, 4,890,245, Cl. 364-557.000.
Uemori, Satoru: *See*—
Araki, Kazuhiko; Kuroda, Tsuyoshi; Uemori, Satoru; Moriguchi, Akihiko; and Ikeda, Yoshifumi, 4,889,857, Cl. 514-235.200.
Uherek, Robert J., Sr.; and Claycomb, Jack R. Blast joint. 4,889,185, Cl. 166-243.000.
Uhl, Ullrich: *See*—
Senft, Ernst; Klemmer, Herbert; Uhl, Ullrich; Naumann, Emil; and Schefcsik, Nikolaus, 4,889,007, Cl. 74-506.000.
Uhlmann, Dominique: *See*—
Fell, Claude; Pages, Etienne; and Uhlmann, Dominique, 4,889,524, Cl. 494-12.000.

Ulrich, Lawrence W.; and Lojewski, James R., to Durable Pakaging Corporation. Carton sealing apparatus. 4,889,581, Cl. 156-443.000.
Umetani, Keiji; Ueda, Ken; Suzuki, Ryuichi; and Yokouchi, Hisatake, to Hitachi, Ltd. Spectral type radiation imaging system. 4,890,310, Cl. 378-82.000.
Umezu, Nubuhiko, to Sony Corporation. Light beam deflector devices. 4,889,415, Cl. 350-358.000.
Unagami, Shigeyuki: *See—*
Taniguchi, Tomohiko; Iseda, Kohei; Okazaki, Koji; Amano, Fumio; and Unagami, Shigeyuki, 4,890,325, Cl. 381-34.000.
Ungerboeck, Gottfried: *See—*
Dolivo, Francois B.; and Ungerboeck, Gottfried, 4,890,299, Cl. 375-18.000.
Unilever Patent Holdings B.V.: *See—*
Davis, Paul J.; and Porter, Philip, 4,889,816, Cl. 436-518.000.
Union Camp Corporation: *See—*
Firth, William C., Jr., 4,889,645, Cl. 252-8.514.
Locko, George A., 4,889,285, Cl. 239-34.000.
Union Carbide Chemicals and Plastics Company Inc.: *See—*
Fan, You-Ling; Stanley, James P.; and Brode, George L., 4,889,887, Cl. 524-510.000.
Union Carbide Corporation and Plastics Company Inc.: *See—*
Lewis, Kenrick M.; and Chang, Ching-Feng, 4,889,838, Cl. 502-27.000.
Unisys Corporation: *See—*
Leonard, Antony J.; and Macleod, Donald A., 4,889,332, Cl. 271-108.000.
Zscheile, John W., Jr.; Lundquist, Alan E.; and Spencer, Billie M., 4,890,297, Cl. 375-1.000.
United Kingdom Atomic Energy Authority: *See—*
Ford, James; and Webb, John, 4,889,683, Cl. 376-336.000.
United States of America
Army: *See—*
Pohlmann, Juergen L. W.; Honey, Richard C.; and Guagliardo, John L., 4,890,075, Cl. 330-4.300.
Energy: *See—*
Day, Robert A., 4,888,861, Cl. 29-25.350.
Steeper, Timothy J., 4,888,979, Cl. 73-40.700.
Health and Human Services: *See—*
Kolobow, Theodor, 4,889,137, Cl. 128-898.000.
National Aeronautics and Space Administration: *See—*
Hergenrother, Paul M.; Connell, John W.; and Havens, Stephen J., 4,889,912, Cl. 528-125.000.
Kosmahl, Henry G., 4,890,036, Cl. 315-3.500.
Wang, Charles C., 4,890,252, Cl. 364-717.000.
Navy: *See—*
Gagliardi, Richard P., 4,890,109, Cl. 342-14.000.
Kersey, Alan D.; and Dandridge, Anthony, 4,889,986, Cl. 250-227.000.
U.S. Philips Corporation: *See—*
Auding, Hans; Frank, Gunter; Kostlin, Heiner; and Vitt, Bruno, 4,889,974, Cl. 219-543.000.
Bader, Edgar, 4,890,303, Cl. 375-107.000.
Bijma, Jan; and Van Den Beld, Antonius J. M., 4,890,032, Cl. 313-412.000.
Bird, Philip H., 4,890,020, Cl. 307-571.000.
Buschow, Kurt H. J., 4,889,607, Cl. 204-192.150.
Davie, Alan J., 4,890,043, Cl. 315-408.000.
Den Boef, Johannes H., 4,890,061, Cl. 324-320.000.
Jansen, Cornelis J. A., 4,890,324, Cl. 380-43.000.
Muilwijk, Dirk, 4,890,302, Cl. 375-80.000.
Selie, Daniel; and Boissenot, Philippe, 4,889,821, Cl. 437-31.000.
Selle, Daniel; Boissenot, Philippe; and Rabinzohn, Patrick, 4,889,824, Cl. 437-31.000.
Straver, Willibrordus G. M. M.; and Nordholt, Ernst H., 4,890,066, Cl. 329-369.000.
Zwier, Jan, 4,890,031, Cl. 313-409.000.
U.S. Tool & Die, Inc.: *See—*
Wachter, William J., 4,889,680, Cl. 376-261.000.
Wachter, William J.; and Fuierer, Anton A., 4,889,681, Cl. 376-272.000.
United Technologies Corporation: *See—*
McComas, Charles C., 4,889,589, Cl. 156-646.000.
Murphy, Richard D.; and Fischer, William C., 4,890,284, Cl. 371-9.100.
Simon, James W., Jr.; and Gorman, Kathleen, 4,889,582, Cl. 148-12.70A.
University of Akron: *See—*
Smith, Daniel J.; and Patel, Sanjay R., 4,889,530, Cl. 604-304.000.
University of California, The Regents of the: *See—*
Asmus, John F.; and Lovberg, Ralph H., 4,889,605, Cl. 204-157.440.
Parslow, Tristram G.; and Yamamoto, Keith R., 4,889,802, Cl. 435-69.100.
University of Missouri, The Curators of the: *See—*
Day, Delbert E.; and Ehrhardt, Gary J., 4,889,707, Cl. 424-1.100.
University of North Carolina at Chapel Hill, The: *See—*
Hutcheson, J. Stanford; Lutz, Richard W.; Obrist, Paul A.; Flaugher, David J.; and Watts, Charles E., 4,889,132, Cl. 128-680.000.
University of Southern Mississippi: *See—*
Mathias, Lon J.; and Kusefoglu, Selim H., 4,889,948, Cl. 560-181.000.
University of Toronto Innovations Foundation, The: *See—*
Diosady, Levente L.; Rubin, Leon J.; and Tzeng, Yew-Min, 4,889,921, Cl. 530-377.000.
University of Waterloo: *See—*
Spink, Donald R.; and Stein, Jerry Y., 4,889,694, Cl. 423-110.000.
Unland, Stefan: *See—*
Beyer, Hans-Ernst; Bonitz, Jorg; Entenmann, Robert; Forster, Siegmar; Knab, Rochus; Kunzel, Walter; Kugler, Wolfgang; Mahlberg, Alfred; Miller, Bernhard; Philipp, Matthias; Rohde, Siegfried; Unland, Stefan; Viess, Walter; Winter, Herbert; and Zimmermann, Jurgen, 4,889,094, Cl. 123-414.000.
Uno, Hitoshi; Kurokawa, Mikio; Sato, Fuminori; Naruto, Shunsuke; and Masuda, Yoshinobu, to Dainippon Pharmaceutical Co., Ltd. Dibenz[b,e]oxepin derivatives and pharmaceutical composition containing the same. 4,889,858, Cl. 514-254.000.
Uno, Takaaki; Yamahata, Hiroshi; and Chiba, Kazuo, to Nissan Motor Company, Limited. Insulator for use in automotive suspension or the like. 4,889,328, Cl. 267-293.000.
Uno, Toshiyuki: *See—*
Maeda, Yoshiyasu; Inoue, Yasuhiro; Uno, Toshiyuki; and Suzuki, Kazuyoshi, 4,888,945, Cl. 57-264.000.
Unterstein, Klaus: *See—*
Grosswendt, Werner; and Unterstein, Klaus, 4,889,030, Cl. 89-1.140.
Grosswendt, Werner; Unterstein, Klaus; and Simon, Walter, 4,889,053, Cl. 102-348.000.
UOP: *See—*
Miller, James G.; Pellet, Regis J.; Shamshoum, Edwar S.; and Rabo, Jule A., 4,889,616, Cl. 208-114.000.
Urai, Yoshio: *See—*
Iwata, Yasuo; Mae, Shigenori; Urai, Yoshio; and Tsunoda, Takayuki, 4,889,557, Cl. 75-249.000.
Urata, Yasuhiro: *See—*
Yagi, Toru; Fujiyoshi, Yoshihiro; Aoki, Takatoshi; and Urata, Yasuhiro, 4,889,085, Cl. 123-90.120.
Urszin nee Simon, Eszter: *See—*
Balogh, Karoly; Dombay, Zsolt; Fodor, Karoly; Grega nee Toth, Erzebet; Lorik, Erno ; Magyar nee Tomorkenyi, Magdolna; Nagy, Jozsef; Pasztor, Karoly; Santha, Pal; Tarpai, Gyula; Toth, Istvan; and Urszin nee Simon, Eszter, 4,889,944, Cl. 558-171.000.
Ushiro, Seimei: *See—*
Takei, Hisashi; Ohmura, Hiroshi; Ushiro, Seimei; Mochida, Mitsuyoshi; Nakamura, Yoshihiko; Asano, Seiji; and Yoshida, Toshio, 4,890,130, Cl. 354-288.000.
Ushizawa, Koji, to Daiichi Pure Chemicals Co., Ltd. 3α-hydroxysteroid oxidase and quantitative analysis of 3α-hydroxysteroid making use of same. 4,889,801, Cl. 435-25.000.
Usuki, Arimitsu; Mizutani, Tadashi; Fukushima, Yoshiaki; Fujimoto, Megumi; Fukumori, Kenzo; Kojima, Yoshitsugu; Sato, Norio; Kurauchi, Toshio; and Kamigaito, Osami, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Composite material containing a layered silicate. 4,889,885, Cl. 524-445.000.
Utiumi, Shinichiro: *See—*
Kawamura, Hirotaka; Ohtsu, Norio; and Utiumi, Shinichiro, 4,889,943, Cl. 558-71.000.
Utsumi, Kenichi; Yuasa, Tetsuya; Goto, Yasuyuki; Tsugawa, Iwao; and Koshino, Nagaaki, to Fujitsu Limited. Process for manufacturing an optical recording medium. 4,889,746, Cl. 427-162.000.
Uuskallio, Arvo F.: *See—*
Kolinske, Edmund C.; and Uuskallio, Arvo F., 4,889,006, Cl. 74-502.400.
Vachette: *See—*
Girard, Joel; and Wattebled, Christian, 4,889,371, Cl. 292-201.000.
Vago, Otto Z.; and Wenczl, Ernest, to State Industries, Inc. Water heater construction and method of manufacture. 4,889,105, Cl. 126-361.000.
Vago, Robert E., to Malmros Holding, Inc. Bathing system. 4,888,834, Cl. 4-540.000.
Valdes, Rodolfo G.: *See—*
Garcia, Gilbert C.; and Valdes, Rodolfo G., 4,888,833, Cl. 4-480.000.
Valeo: *See—*
Chasseguet, Gustave; and Paquin, Jacques, 4,889,218, Cl. 192-106.200.
Valmet Paper Machinery Inc.: *See—*
Kerttula, Reima, 4,888,883, Cl. 34-116.000.
Meinander, Paul O., 4,889,073, Cl. 427-356.000.
Niskanen, Juhani, 4,889,598, Cl. 162-199.000.
Van Bise, William L.: *See—*
Rauscher, Elizabeth A.; and Van Bise, William L., 4,889,526, Cl. 600-14.000.
Van Broekhoven, Johannes A. M.; Geuze, Maarten M.; and Salter, James A., to Shell Oil Company. Preparation of carbon monoxide/olefin copolymer with removal of s/Fe from carbon monoxide monomer. 4,889,914, Cl. 528-392.000.
Van Broekhoven, Paul; and Guinon, Walter J., to Charles Stark Draper Laboratory, Inc., The. Compensated chirp fourier transformer. 4,890,055, Cl. 324-77.00B.
Van Den Beld, Antonius J. M.: *See—*
Bijma, Jan; and Van Den Beld, Antonius J. M., 4,890,032, Cl. 313-412.000.
van den Haak, Rob. Method of tensioning an anchor line, in particular for testing an anchor, and a device for carrying out the method, particularly comprising a cable or chain stopper. 4,889,065, Cl. 114-293.000.
Van Der Heijden, Arnoldus: *See—*
Doornbos, Tamme S. M.; Haring, Petrus; and Van Der Heijden, Arnoldus, 4,889,736, Cl. 426-536.000.

Van Dijk, Cornelis: *See*—
Van Veen, Jacobus J. F.; Konig, Johan W.; Ter Kuile, Willem M.; and Van Dijk, Cornelis, 4,889,427, Cl. 356-445.000.

Van Dijk, Jan: *See*—
Van Wijngaarden, Ineke; Zwagemakers, Johannes M. A.; and Van Dijk, Jan, 4,889,849, Cl. 514-218.000.

Van Doorn, Johannes A.; and Meijboom, Nicolaas, to Shell Oil Company. Preparation of methoxy phenyl phosphides. 4,889,956, Cl. 568-13.000.

Vanguard Products Corporation: *See*—
Mackevich, Daniel A., 4,890,050, Cl. 322-34.000.

van Quekelberghe, Eric P. J.: *See*—
Strong, Russell W.; and van Quekelberghe, Eric P. J., 4,889,517, Cl. 460-66.000.

van Rassel, William: *See*—
Seth-Smith, Nigel; Bates, Cameron; Lim, Samson; van Rassel, William; Yoneda, Robert; and Lucas, Keith, 4,890,321, Cl. 380-20.000.

van Uitert, Johannes H. Device for supplying containers to an apparatus for handling them. 4,889,225, Cl. 198-444.000.

Van Veen, Jacobus J. F.; Konig, Johan W.; Ter Kuile, Willem M.; and Van Dijk, Cornelis, to Nederlandse Organisatie Voor Toegepastnatuurwetenschappelijk Onderzoek Tno. Method and apparatus for detecting low concentrations of (bio) chemical components present in a test medium using surface plasmon resonance. 4,889,427, Cl. 356-445.000.

Van Wijngaarden, Ineke; Zwagemakers, Johannes M. A.; and Van Dijk, Jan, to Duphar International Research B.V. Spasmolytically active tertiary amine derivatives. 4,889,849, Cl. 514-218.000.

Vargas, Ky, to Temporary Windows, Inc. Temporary window. 4,889,754, Cl. 428-41.000.

Varin, Michel, to Etablissements Georges Olivier S.A. Vacuum cleaner suction head for picking up threads. 4,888,852, Cl. 15-400.000.

Vaudaine, Pierre: *See*—
Clerc, Jean-Frederic; Deutsch, Jean-Claude; Vaudaine, Pierre; and Vey, Sylvie, 4,889,412, Cl. 350-347.00E.

Vaughan, Robert A.; and Belser, John W., to Standard Products Company, The. Self-locking door trim for flush glass. 4,888,929, Cl. 52-400.000.

Vaya, Jacob; Ladkani, David; Schoenberger, Clara; Kaspi, Joseph; Salemnick, Gad; Yellin, Haim; and Cherkez, Stephan, to Astra Lakemedel Aktiebolag. Preparation of 1'-ethoxycarbonyl-oxyethyl esters of penicillins. 4,889,929, Cl. 540-318.000.

Vaz, Claudio M.: *See*—
Da Silva Telles, Affonso C. S.; and Vaz, Claudio M., 4,889,805, Cl. 435-161.000.

Velluz, Alain: *See*—
Pickenhagen, Wilhelm; and Velluz, Alain, 4,889,735, Cl. 426-536.000.

Veltman, Preston L. Means to promote the neutralization reaction between particulate calcium carbonate and ionized phosphate. 4,889,725, Cl. 424-675.000.

Vensel, Charles D.: *See*—
Frost, Terry; Smith, Terry B.; and Vensel, Charles D., 4,889,463, Cl. 414-416.000.

Vera, Eduardo S.; and Stupp, Edward H., to North American Philips Corporation. Dielectric passivation. 4,890,150, Cl. 357-52.000.

Verbrugge, Jeroen K. J.; and Aurik, Erik A., to Multinorm B.V. Movable accomodation or container in which is arranged apparatus for automatic milking of an animal. 4,889,074, Cl. 119-14.030.

Vercellone, Vinicio: *See*—
Balboni, Gian P.; Giandonato, Giuseppe; Melen, Riccardo; and Vercellone, Vinicio, 4,890,281, Cl. 370-60.000.

Vermeiren, Karel N., to SKF Industrial Trading and Development Co. B.V. Device for measuring the effective viscosity of a lubricant. 4,888,976, Cl. 73-10.000.

Vettel, Paula R., to Amoco Corporation. Nitrogen containing dispersants treated with mineral acids. 4,889,646, Cl. 252-32.70E.

Vey, Sylvie: *See*—
Clerc, Jean-Frederic; Deutsch, Jean-Claude; Vaudaine, Pierre; and Vey, Sylvie, 4,889,412, Cl. 350-347.00E.

VG Instruments Group Limited: *See*—
Phillips, Robert B.; and Stonestreet, Paul R., 4,889,319, Cl. 251-368.000.

Victor Company of Japan, Ltd.: *See*—
Katoh, Hiroshi; Taguchi, Hiromi; and Kikunaga, Shoji, 4,890,177, Cl. 360-107.000.
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 4,890,124, Cl. 346-160.000.

Viess, Walter: *See*—
Beyer, Hans-Ernst; Bonitz, Jorg; Entenmann, Robert; Forster, Siegmar; Knab, Rochus; Kunzel, Walter; Kugler, Wolfgang; Mahlberg, Alfred; Miller, Bernhard; Philipp, Matthias; Rohde, Siegfried; Unland, Stefan; Viess, Walter; Winter, Herbert; and Zimmermann, Jurgen, 4,889,094, Cl. 123-414.000.

Vietti, Michael A.: *See*—
Baer, John S.; and Vietti, Michael A., 4,888,986, Cl. 73-188.000.

Villavicencio, Eduardo J.; and Gomez-Estevez, Camilo, to Process Evaluation and Development Corporation. *Crotalaria juncea* paper pulps. 4,889,591, Cl. 162-20.000.

Vinson, Jean-Paul: *See*—
Delahaye, Jean-Yves; and Vinson, Jean-Paul, 4,890,333, Cl. 455-67.000.

Virkola, Nils E.: *See*—
Tikka, Panu; and Virkola, Nils E., 4,889,593, Cl. 162-49.000.

Viscodrive GmbH: *See*—
Wiese, Helmut; and Schonenbrucher, Paul-Erich, 4,889,206, Cl. 180-248.000.

Viskase Corporation: *See*—
Hansen, James R.; Nicholson, Myron D.; and Sherry, Jeffrey B., 4,889,751, Cl. 428-34.800.

Vistakon, Inc.: *See*—
Kindt-Larsen, Ture; Heaton, John C.; and Rastrelli, Edmund C., 4,889,664, Cl. 264-2.600.

Vitt, Bruno: *See*—
Auding, Hans; Frank, Gunter; Kostlin, Heiner; and Vitt, Bruno, 4,889,974, Cl. 219-543.000.

Vittone, Larry W. Expansion joint for settable compositions. 4,889,445, Cl. 404-64.000.

Viverito, Angelo N.: *See*—
Felker, Michael A.; Viverito, Angelo N.; Gilstrap, John W.; Martos, Jesus J.; Trujillo, Ruben; and Wang, Chang J., 4,890,278, Cl. 370-17.000.

Voest-Alpine Aktiengesellschaft: *See*—
Pusch, Hermann; Zeller, Siegfried; Millionis, Konstantin; and Kresl, Hans, 4,889,323, Cl. 266-142.000.

Vola, Jean-Jacques, to Cosmetic Production. Boxes for packaging or storage of various objects. 4,889,254, Cl. 220-23.400.

von Broock, Ulrich, to Dr. Ing. h.c.F. Porsche Aktiengesellschaft. Elastic bearing for a driving assembly of a motor vehicle. 4,889,207, Cl. 180-291.000.

Von Weissenfluh, Beat, to Hawe-Neos Dental Dr. H.v. Weissenfluh AG. Device with spindle and grinding disk, particulary for dentists, and method for the manufacture thereof. 4,889,489, Cl. 433-134.000.

Vorwerk & Co. Interholding GmbH: *See*—
Helmes, Ludger; and Lienenluke, Paul, 4,888,850, Cl. 15-359.000.

Vu, Thuan D.; and Spector, George. Carpet mat switch. 4,890,007, Cl. 307-118.000.

W. R. Grace & Co.: *See*—
Wallace, John L., 4,889,765, Cl. 428-290.000.

W. R. Grace & Co.-Conn.: *See*—
Williams, Allen C., Jr., 4,889,731, Cl. 426-106.000.

WABCO Westinghouse Fahrzeugbremsen GmbH: *See*—
Eckert, Horst; Feldmann, Joachim; and Warendorf, Gerhard, 4,888,997, Cl. 73-862.650.
Goral, Erhard; and Mensing, Walter, 4,889,037, Cl. 92-78.000.

Wachter, William J., to U.S. Tool & Die, Inc. Method for compacting spent nuclear reactor fuel rods. 4,889,680, Cl. 376-261.000.

Wachter, William J.; and Fuierer, Anton A., to U.S. Tool & Die, Inc. Apparatus for reducing floor and seismic loadings in underwater storage areas used in the storing of spent nuclear fuel rods. 4,889,681, Cl. 376-272.000.

Wacom Co., Inc.: *See*—
Taguchi, Yoshinori; and Yamanami, Tsuguya, 4,890,096, Cl. 340-712.000.

Wada, Mitsuo; Kanoe, Toshio; and Ishikawa, Takayuki, to Polyplastics Co., Ltd. Liquid crystal polyester composition. 4,889,886, Cl. 524-449.000.

Wada, Nobuhide; Saito, Yoshihiro; Kusano, Shoji; Toyokawa, Yasufumi; Miyazawa, Takeshige; and Takahashi, Satoru, to Kumiai Chemical Industry Co., Ltd.; and Ihara Chemical Industry Co., Ltd. 2-Phenoxypyrimidine derivative and herbidical composition. 4,889,552, Cl. 71-92.000.

Wada, Tatsuo; Miki, Toshiro; and Takenaka, Masamitsu, to Meiko Electronics Co., Ltd.; and Toagosei Chemical Industry Co., Ltd. Method of producing conductor circuit boards. 4,889,584, Cl. 156-630.000.

Wade, Gentry E.: *See*—
Gou, Perng-Fei; and Wade, Gentry E., 4,889,682, Cl. 376-283.000.

Wagner, Arthur F.: *See*—
Tolman, Richard L.; Wagner, Arthur F.; Baldwin, John J.; and Pietruszkiewicz, Adolph, 4,889,856, Cl. 514-254.000.

Wagner, Kenneth A., to Product Concepts, Inc. Post brace apparatus and system. 4,889,322, Cl. 256-36.000.

Wagner, Otto M.: *See*—
Klein, Klaus; Pollmann, Kurt; Schettler, Helmut; Schulz, Uwe; Wagner, Otto M.; and Zuehlke, Rainer, 4,890,238, Cl. 364-491.000.

Wakabayashi, Yuzuru: *See*—
Tazawa, Toshiaki; Yotsumoto, Masahiro; Tanahashi, Hiroshi; and Wakabayashi, Yuzuru, 4,889,743, Cl. 426-495.000.

Waldner, Adrian; and Meyer, Willy, to Ciba-Geigy Corporation. 4-azasaccharines, 4-aza-dihydro- or -tetrahydro-saccharines. 4,889,933, Cl. 546-114.000.

Walker, Charles S., to Honeywell Inc. Noise spike elimination circuit for pulse width modulators. 4,890,021, Cl. 307-572.000.

Walker, Grant W. Golf swing analyzer. 4,889,341, Cl. 273-176.00F.

Walker, Robert; Fitzgerald, Robert; and Bippus, Hans-Dieter, to Krone Aktiengesellschaft. Method and apparatus for interconnecting optical wave guides. 4,889,405, Cl. 350-96.210.

Wallace Computer Services, Inc.: *See*—
Steidinger, Donald J., 4,889,278, Cl. 229-92.100.

Wallace, John L., to W. R. Grace & Co. Ink-receptive, water-based, coatings. 4,889,765, Cl. 428-290.000.

Wallach, Clifford H.: *See*—
Walsh, Dale M.; and Wallach, Clifford H., 4,890,316, Cl. 379-98.000.

Walsh, Dale M.; and Wallach, Clifford H. Modem for communicating at high speed over voice-grade telephone circuits. 4,890,316, Cl. 379-98.000.

Waltap Ltd.: *See*—
Schachner, Aryeh; and Ovil, Yoel, 4,889,112, Cl. 128-200.260.

Wang, Chang J.: *See*—
Felker, Michael A.; Viverito, Angelo N.; Gilstrap, John W.; Martos, Jesus J.; Trujillo, Ruben; and Wang, Chang J., 4,890,278, Cl. 370-17.000.

Wang, Charles C., to United States of America, National Aeronautics and Space Administration. Long period pseudo random number sequence generator. 4,890,252, Cl. 364-717.000.

Wang, Karl L.: *See*—
Teng, Ker-Wen; Wang, Karl L.; Nguyen, Bich-Yen; and Wu, Wei, 4,890,144, Cl. 357-23.400.

Wang, Moon-Yee: *See*—
Chuang, Patrick T.; Yau, Robert L.; Yoshida, Hiroshi; and Wang, Moon-Yee, 4,890,260, Cl. 365-49.000.

Wang, Pen C., to Shell Oil Company. Polymeric polyhyroxy polyether containing 1,6-diazaspiro-[4.4]nonane-2,7-dione units. 4,889,907, Cl. 528-96.000.

Wang, Ted T. H. Toy bed transformers. 4,888,837, Cl. 5-93.00R.

Ward, Marcus J. S.; and Seymour, Peter J., to Ford Motor Company. Door handle unit. 4,889,373, Cl. 292-336.300.

Warendorf, Gerhard: *See*—
Eckert, Horst; Feldmann, Joachim; and Warendorf, Gerhard, 4,888,997, Cl. 73-862.650.

Warner-Lambert Company: *See*—
Bartell, Ralph; Boissonneault, Roger; and Blischok, Monica, 4,889,236, Cl. 206-531.000.

Washington University: *See*—
Olson, Maynard V.; and Burke, David T., 4,889,806, Cl. 435-172.300.

Watanabe, Izumi; and Yamana, Keiichi, to Fuji Photo Film Co., Ltd. Apparatus for grounding cassette. 4,889,296, Cl. 242-199.000.

Watanabe Kunio: *See*—
Yoshikawa, Akihisa; Tajima, Masamichi; Watanabe Kunio; and Sato, Toshiharu, 4,889,036, Cl. 91-403.000.

Watanabe, Tetsuo: *See*—
Sasaki, Eiichi; Mori, Takashi; and Watanabe, Tetsuo, 4,890,120, Cl. 346-76.0PH.

Watanabe, Toshinori; Haruna, Koichi; Motoyama, Hiroshi; Nishigaki, Toru; Sasaki, Koji; Yakata, Teruo; and Watanabe, Yoshitaka, to Hitachi, Ltd. Autonomous resource management system with recorded evaluations of system performance with scheduler control including knowledge learning function. 4,890,227, Cl. 364-300.000.

Watanabe, Yoshio, to Kabushiki Kaisha Machida Seisakusho. Treating instrument for endoscope. 4,889,106, Cl. 128-4.000.

Watanabe, Yoshitaka: *See*—
Watanabe, Toshinori; Haruna, Koichi; Motoyama, Hiroshi; Nishigaki, Toru; Sasaki, Koji; Yakata, Teruo; and Watanabe, Yoshitaka, 4,890,227, Cl. 364-300.000.

Water Pollution Control Corporation: *See*—
Schmit, Frank L.; Redmon, David T.; and Ewing, Lloyd, 4,889,620, Cl. 210-137.000.

Watmough, David; and Chan, Kwok K., to Aberdeen University. Divergent ultrasound arrays. 4,889,122, Cl. 128-399.000.

Watson, Thomas J. Identity light. 4,890,203, Cl. 362-102.000.

Watt, Charles R.; Groll, Frederick K.; and Scaramuzzo, John A., Jr., to Digital Equipment Corporation. Automatic servo gain calibration system for a disk drive. 4,890,172, Cl. 360-77.040.

Wattebled, Christian: *See*—
Girard, Joel; and Wattebled, Christian, 4,889,371, Cl. 292-201.000.

Watts, Charles E.: *See*—
Hutcheson, J. Stanford; Lutz, Richard W.; Obrist, Paul A.; Flaugher, David J.; and Watts, Charles E., 4,889,132, Cl. 128-680.000.

Wawryk, Randy A. Board game. 4,889,345, Cl. 273-249.000.

Weaver, Kim A.; Jones, James M.; and Thibault, Joseph A., to Production Control Units, Inc. Dispensing tool assembly for charging a refrigerant or other fluid into a system. 4,889,149, Cl. 137-1.000.

Webb, John: *See*—
Ford, James; and Webb, John, 4,889,683, Cl. 376-336.000.

Weber, Hans, to Benninger AG. Method for mercerizing textile fabric webs and apparatus for carrying out the method. 4,888,840, Cl. 8-151.000.

Weber, Kurt: *See*—
Hefti, Heinz; Artz, Klaus; Weber, Kurt; Burdeska, Kurt; and Reinehr, Dieter, 4,889,655, Cl. 252-301.220.

Weber, Vincent L.: *See*—
Crouser, Darwin S.; and Weber, Vincent L., 4,888,851, Cl. 15-371.000.

Wedekind, Reinhard: *See*—
Trenkler, Gerhard; Wedekind, Reinhard; and Maier, Reinhard, 4,890,058, Cl. 324-158.0MG.

Weger, Peter: *See*—
Bertagnolli, Emmerich; and Weger, Peter, 4,889,823, Cl. 437-31.000.

Wegner, Peter; Kruger, Hans-Rudolf; Baumert, Dietrich; and Joppien, Hartmut, to Schering Aktiengesellschaft. 2-(2,2-Difluorocyclopropyl)alkyl esters, processes for their preparation and their use as insecticides and acaricides. 4,889,870, Cl. 514-429.000.

Wei, Che-Chia: *See*—
Tang, Thomas E.; Wei, Che-Chia; Haken, Roger A.; and Chapman, Richard A., 4,890,141, Cl. 357-23.300.

Weishaupt, Kenneth R.: *See*—
Dougherty, Thomas J.; Potter, William R.; and Weishaupt, Kenneth R., 4,889,129, Cl. 128-664.000.

Weiss, Franz-Josef: *See*—
Fuchs, Hugo; Ritz, Josef; Thomas, Erwin; and Weiss, Franz-Josef, 4,889,704, Cl. 423-387.000.

Weiss, Stefan: *See*—
Schuster, Ludwig; Hettche, Albert; Liedy, Werner; Weiss, Stefan; and Ehemann, Leo, 4,889,897, Cl. 525-388.000.

Weissenfels, Franz: *See*—
Aust, Aloys; Tiroux, Josef; and Weissenfels, Franz, 4,889,875, Cl. 521-123.000.

Wen, Maz. Eccentrically operating speed-variating means for bicycle. 4,889,354, Cl. 280-236.000.

Wenczl, Ernest: *See*—
Vago, Otto Z.; and Wenczl, Ernest, 4,889,105, Cl. 126-361.000.

Werner, Johannes; Kerschbaum, Walter; and Heinrich, Rolf, to Daimler-Benz AG. Crankshaft drive of an internal-combustion engine of V-type. 4,889,090, Cl. 123-197.0AC.

Wesson, David S.: *See*—
Sommers, Kenneth C.; Wesson, David S.; and George, Kevin R., 4,889,183, Cl. 166-55.000.

West, Gary A.: *See*—
Hou, Janpu; Chai, Bruce H.; Badding, David D.; West, Gary A.; and Marcus, Stephen L., 4,889,993, Cl. 250-365.000.

West, Terence H.: *See*—
Casey, Shawn E.; and West, Terence H., 4,890,176, Cl. 360-105.000.

Westermann, Jurgen: *See*—
Rowson, Graham P.; Head, John C.; Westermann, Jurgen; Kruger, Martin; Arndt, Friedrich; and Rees, Richard, 4,889,553, Cl. 71-92.000.

Westinghouse Electric Corp.: *See*—
Cox, Jimmy A.; and Wilson, Ian L., 4,888,863, Cl. 29-156.80B.
Dighe, Shyam V., 4,889,556, Cl. 75-10.220.
Ettehadieh, Bozorg, 4,889,060, Cl. 110-246.000.
Hill, Norris L., 4,890,086, Cl. 336-210.000.
Jaafar, Hamedo A.; Katzor, Karl A.; Rethage, Wilbert B.; Pompa, Gerard A.; Dailey, George F.; and Guenther, Paul, 4,889,000, Cl. 73-865.800.
Jacomini, Omar J., 4,890,113, Cl. 342-163.000.
McKee, Jere L.; Beatty, William E., Jr.; and Thomas, Glenn R., 4,890,081, Cl. 335-18.000.
Scalzo, Augustine J., 4,889,470, Cl. 415-209.200.
Shuey, Kenneth C., 4,890,089, Cl. 340-310.00A.
Silvestri, George J., Jr., 4,888,954, Cl. 60-660.000.
Snyder, David A.; and Anderson, Johnny J., 4,889,679, Cl. 376-258.000.
Whitlow, Graham A.; and Lee, Suh Y., 4,889,059, Cl. 110-246.000.
Yang, Wen-Ching; Lee, Suh Y.; and Ettehadieh, Bozorg, 4,889,058, Cl. 110-214.000.

Wet Enterprises, Inc.: *See*—
Fuller, Mark; and Robinson, Alan S., 4,889,283, Cl. 239-11.000.

Whetsel, James E.: *See*—
Brosnan, Denis A.; Whetsel, James E.; Singer, Richard E.; Samas, Mark V.; Amos, Michael D.; and Kovarik, David P., 4,889,324, Cl. 266-157.000.

Whirlpool Corporation: *See*—
Fanson, Richard L.; and Denny, Ralph E., 4,888,965, Cl. 68-23.400.

Whitaker, T. Mark: *See*—
Rak, Thomas A.; and Whitaker, T. Mark, 4,888,996, Cl. 73-862.190.

White, David A., to Grumman Allied Industries, Inc. Seat with three point user restraint. 4,889,389, Cl. 297-468.000.

White, Jack C.: *See*—
Su, Kai C.; and White, Jack C., 4,889,693, Cl. 422-113.000.

Whitlow, Graham A.; and Lee, Suh Y., to Westinghouse Electric Corp. Rotary combustor wall and method of forming same. 4,889,059, Cl. 110-246.000.

Widmer, Ulrich, to Hoffman-La Roche Inc. Tricyclic pyridone derivatives. 4,889,854, Cl. 514-228.200.

Widmer, Ulrich: *See*—
Fischer, Ulf; Schneider, Fernand; and Widmer, Ulrich, 4,889,848, Cl. 514-212.000.

Wiedemann, Achim, to Sandoz Ltd. Organic compounds. 4,889,945, Cl. 558-186.000.

Wiegand, Jurgen: *See*—
Prein, Franz; Wiegand, Jurgen; Frey, Peter; and Klink, Norbert, 4,890,035, Cl. 313-633.000.

Wiese, Helmut; and Schonenbrucher, Paul-Erich, to Viscodrive GmbH. Viscous shear coupling. 4,889,206, Cl. 180-248.000.

Wiesler, Oren L.: *See*—
Ellis, Ronald M., Jr.; Wiesler, Oren L.; and Mega, Christopher A., 4,890,225, Cl. 364-200.000.

Wight, Patrick W. Apparatus for donning sterile gloves and sterile glove package for use therewith. 4,889,266, Cl. 223-111.000.

Wilcken, Stephen W.: *See*—
Edwards, Frank E.; and Wilcken, Stephen W., 4,889,425, Cl. 356-152.000.

Wilczynski, James M.: *See*—
Jamrozy, Richard E.; and Wilczynski, James M., 4,889,055, Cl. 105-355.000.

Wilda, Douglas W.: *See*—
Mathias, Milton W.; and Wilda, Douglas W., 4,888,992, Cl. 73-727.000.

Wiley, Robert E., to Acheson Industries, Inc. Conductive coatings and foams for anti-static protection, energy absorption, and electromagnetic compatibility. 4,889,750, Cl. 428-34.200.

Wilkinson, Brian: *See*—
Rockford, David B.; Sutton, William H.; Bond, Christopher R.; and Wilkinson, Brian, 4,889,638, Cl. 210-703.000.

Wilkinson, John D.: *See*—
Campbell, Roy E.; Wilkinson, John D.; and Hudson, Hank M., 4,889,545, Cl. 62-24.000.
Wilkinson, Wilfred H., to Rolls-Royce (1971) Limited. A nozzle guide vane structure for a gas turbine engine. 4,889,469, Cl. 415-191.000.
Willard, Miles J.; Dayley, Kyle E.; Hix, Veldon M.; and Holm, David A. Method for controlling puffing of a snack food product. 4,889,733, Cl. 426-438.000.
Willard, Miles J.; Dayley, Kyle E.; Hix, Veidon M.; and Holm, David A. Fried snack product having dockering holes therein. 4,889,737, Cl. 426-550.000.
Willberg, Hans H.; and Ueberreiter, Ekkehard, to Multitest Elektronische Systeme. Device for testing and sorting electronic components, more particularly integrated circuit chips. 4,889,242, Cl. 209-573.000.
Willer, Josef, to Siemens Aktiengesellschaft. Method for the manufacture of a MESFET comprising self aligned gate. 4,889,827, Cl. 437-41.000.
Willer, Rodney L.; Hartwell, James A.; and Gleeson, Robert G., to Morton Thiokol, Inc. High-energy compositions having castable thermoplastic binders. 4,889,571, Cl. 149-19.900.
Wm. Wrigley Jr. Company: *See*—
Dave, Jayant C.; Record, David W.; Nespor, Jill M.; and Hook, Jeffrey S., 4,889,726, Cl. 426-3.000.
Dave, Jayant C.; Record, David W.; Nespor, Jill M.; and Hook, Jeffrey S., 4,889,727, Cl. 426-3.000.
Williams, Allen C., Jr., to W. R. Grace & Co.-Conn. Package having peelable film. 4,889,731, Cl. 426-106.000.
Williams, Charles E.: *See*—
Derryberry, Lesli A.; and Williams, Charles E., 4,890,194, Cl. 361-386.000.
Williams, Howard M., Jr.: *See*—
Micco, Robert D.; and Williams, Howard M., Jr., 4,889,453, Cl. 408-1.00R.
Williams, Richard K.; Bolger, Steven H.; and Rothacher, Duane J., to Siliconix Incorporated. High voltage level shift semiconductor device. 4,890,146, Cl. 357-23.800.
Wilson, Arthur M., to Texas Instruments Incorporated. Integrated circuit product having a polyimide film interconnection structure. 4,890,157, Cl. 357-80.000.
Wilson, Earl L. System for automatically selecting and discharging a pressurized cylinder. 4,889,152, Cl. 137-113.000.
Wilson, Ian L.: *See*—
Cox, Jimmy A.; and Wilson, Ian L., 4,888,863, Cl. 29-156.80B.
Wilson, Michael E., to PCR, Inc. Hydrophobic expanded perlite compositions and process for preparing the same. 4,889,747, Cl. 427-221.000.
Winslow, Donald L.: *See*—
Trenkler, George; Delagi, Richard G.; Padovani, Francois A.; and Winslow, Donald L., 4,890,083, Cl. 335-301.000.
Winter, Herbert: *See*—
Beyer, Hans-Ernst; Bonitz, Jorg; Entenmann, Robert; Forster, Siegmar; Knab, Rochus; Kunzel, Walter; Kugler, Wolfgang; Mahlberg, Alfred; Miller, Bernhard; Philipp, Matthias; Rohde, Siegfried; Unland, Stefan; Viess, Walter; Winter, Herbert; and Zimmermann, Jurgen, 4,889,094, Cl. 123-414.000.
Wirth, Hermann O.: *See*—
Kristen, Ulrich; and Wirth, Hermann O., 4,889,938, Cl. 549-10.000.
Wischusen, Henry, III: *See*—
Sandish, George R.; and Wischusen, Henry, III, 4,889,239, Cl. 206-611.000.
Wise, Janet L., to Texas Instruments Incorporated. Method and circuitry for controlling the compensation of negative internal ground voltage fluctuations. 4,890,015, Cl. 307-443.000.
Witting, Harald L., to General Electric Company. High efficacy electrodeless high intensity discharge lamp exhibiting easy starting. 4,890,042, Cl. 315-248.000.
Wolf, Mitchell E. Flexible arm retainer device. 4,889,303, Cl. 248-160.000.
Wong, Jesse K.: *See*—
Saksena, Anil K.; Wong, Jesse K.; and Mangiaracina, Pietro, 4,889,873, Cl. 514-560.000.
Wood, W. Lawrence: *See*—
Chesnut, M. Gaines; and Wood, W. Lawrence, 4,888,899, Cl. 42-50.000.
Woodcock, John M.: *See*—
Kleinerman, George J.; and Woodcock, John M., 4,888,829, Cl. 2-167.000.
Woodell, Arthur. Engine monitoring and control apparatus. 4,890,088, Cl. 340-459.000.
Woodland, Brent J.: *See*—
Meier, Patricia A.; Meier, W. Jeff; and Woodland, Brent J., 4,889,600, Cl. 203-2.000.
Woods, Gail E.: *See*—
Frey, Robert A.; Woods, Gail E.; and Schmuck, Leroy C., 4,889,175, Cl. 160-90.000.
Woodward, Steven J., to Federal Industries Industrial Group Inc. Acoustic range finding system. 4,890,266, Cl. 367-99.000.
Woolatt, Derek; and Safford, George J., to Dresser Industries, Inc. Compressor valve with flat spring. 4,889,156, Cl. 137-516.130.
Worldwide Converting Machinery: *See*—
Krimsky, Leonard C., 4,889,072, Cl. 118-244.000.
Wortberg, Johannes; Junk, Paul B.; and Franke, Harry, to Battenfeld Fischer Blasformtechnik GmbH. Extruder head. 4,889,477, Cl. 425-133.100.
Wright, Antony P.: *See*—
Gutek, Beth I.; and Wright, Antony P., 4,889,942, Cl. 556-419.000.
Wu, Chien-Chin, to Du Pont de Nemours, E. I., and Company. Freeze-dried pharmaceutical compositions of phenylquinoline carboxylic acids. 4,889,862, Cl. 514-311.000.
Wu, Ching-An, to Fairchild Semiconductor Corporation. Single bonding shelf, multi-row wire-bond finger layout for integrated circuit package. 4,890,153, Cl. 357-74.000.
Wu, Edwin S.; and Kover, Alexander, to Fisons Corporation. Synthetic flavonoids as inhibitors of leukotrienes and 5-lipoxygenase. 4,889,941, Cl. 549-403.000.
Wu, Wei: *See*—
Teng, Ker-Wen; Wang, Karl L.; Nguyen, Bich-Yen; and Wu, Wei, 4,890,144, Cl. 357-23.400.
Wuerzer, Bruno: *See*—
Lange, Arno; Wuerzer, Bruno; and Meyer, Norbert, 4,889,554, Cl. 71-118.000.
Wyss, Bill W.: *See*—
Sorensen, Terry J.; and Wyss, Bill W., 4,889,234, Cl. 206-459.000.
Wythoff, Willem, to Campbell Soup Company. Method for sealing a lid to a container. 4,888,935, Cl. 53-478.000.
XOX Corporation: *See*—
Sinha, Pradeep; and Rahman, Turhan F., 4,890,242, Cl. 364-518.000.
Yabana, Yoshiji: *See*—
Takahashi, Takeshi; Nakamura, Masatake; Yabana, Yoshiji; Ishikawa, Toshiuyki; and Nagata, Koji, 4,889,958, Cl. 174-35.0MS.
Yabe, Shoji: *See*—
Naitoh, Kazumi; Arakawa, Yoshiaki; Ikezaki, Takashi; Yabe, Shoji; Yokoyama, Yutaka; Hamaguchi, Yuichi; Roppongi, Yasunobu; and Hamaguchi, Yuichi, 4,889,536, Cl. 29-570.100.
Yagi, Toru; Fujiyoshi, Yoshihiro; Aoki, Takatoshi; and Urata, Yasuhiro, to Honda Giken Kogyo Kabushiki Kaisha. Valve operating device for internal combustion engine. 4,889,085, Cl. 123-90.120.
Yaginuma, Tamio: *See*—
Takehana, Tsutomu; Kouzai, Tetsuo; Sagara, Masaaki; Yaginuma, Tamio; and Sasaki, Teruji, 4,888,936, Cl. 53-510.000.
Yahagi, Masahiro: *See*—
Ono, Shuichi; Itagaki, Shuichi; and Yahagi, Masahiro, 4,889,837, Cl. 501-139.000.
Yakata, Teruo: *See*—
Watanabe, Toshinori; Haruna, Koichi; Motoyama, Hiroshi; Nishigaki, Toru; Sasaki, Koji; Yakata, Teruo; and Watanabe, Yoshitaka, 4,890,227, Cl. 364-300.000.
Yamada, Hideaki: *See*—
Tanihara, Masao; Oka, Kiichiro; Yamada, Hideaki; Kobayashi, Akira; Nakashima, Toshihide; Omura, Yoshiaki; and Takakura, Koichi, 4,889,917, Cl. 530-324.000.
Yamada, Hideki: *See*—
Jindai, Hideo; Bando, Keiji; Yoshida, Masakazu; and Yamada, Hideki, 4,889,466, Cl. 414-694.000.
Yamada, Kiyoshi: *See*—
Hirahara, Shuzo; Nagato, Hitoshi; Higuchi, Kazuhiko; Yamada, Kiyoshi; Ohno, Tadayoshi; and Kanai, Tsutomu, 4,890,121, Cl. 346-76.0PH.
Yamada, Naoto: *See*—
Yoshimura, Ryoichi; Torii, Shumpeita; and Yamada, Naoto, 4,889,989, Cl. 250-327.200.
Yamada, Yoshihiro; Shirai, Ryoichi; and Hayakawa, Youichi, to Aisin Aw Co., Ltd. Oil strainer for an automatic transmission. 4,889,621, Cl. 210-168.000.
Yamada, Yoshiro: *See*—
Fujiwara, Tadayoshi; Yamaoka, Yukio; Hamada, Kazuichi; Yamada, Yoshiro; Kawaguchi, Yasunobu; Oki, Yasuhiro; Taniguchi, Takashi; and Takahashi, Hiroyuki, 4,889,567, Cl. 148-12.00B.
Yamada, Yoshito: *See*—
Yumoto, Hideaki; Yonemura, Masao; and Yamada, Yoshito, 4,888,978, Cl. 73-40.000.
Yamada, Yu, to Canon Kabushiki Kaisha. Finite distance zoom lens. 4,889,416, Cl. 350-426.000.
Yamaguchi, Hisaaki: *See*—
Nishiyama, Yukinori; Fujioka, Hideaki; Yamaguchi, Hisaaki; Ikeda, Toshiki; and Miyoshi, Keisuke, 4,889,093, Cl. 123-400.000.
Yamaguchi, Tatsuo: *See*—
Murai, Yoshikazu; Yamaguchi, Tatsuo; and Mochizuki, Kanji, 4,889,649, Cl. 252-73.000.
Yamaguchi, Toru: *See*—
Akiyama, Hiroyuki; Izawa, Susumu; Kuwabara, Hideki; and Yamaguchi, Toru, 4,889,671, Cl. 264-53.000.
Yamaguchi, Toshio: *See*—
Nakajima, Nobuyuki; Inomata, Kenichi; Moruta, Masaya; Yamaguchi, Toshio; and Eitai, Kazuo, 4,889,474, Cl. 417-295.000.
Yamaha Corporation: *See*—
Abe, Yasunao, 4,889,026, Cl. 84-611.000.
Yamahata, Hiroshi: *See*—
Uno, Takaaki; Yamahata, Hiroshi; and Chiba, Kazuo, 4,889,328, Cl. 267-293.000.
Yamamoto, Hideki, to NEC Corporation. Start circuit for adapting a constant current generator to a wide variety of loads. 4,890,214, Cl. 363-49.000.
Yamamoto, Kazuo; and Ono, Katsuyasu, to Nippon Seiko Kabushiki Kaisha. Silent, rattle-free passive seat belt system. 4,889,363, Cl. 280-804.000.
Yamamoto, Keith R.: *See*—
Parslow, Tristram G.; and Yamamoto, Keith R., 4,889,802, Cl. 435-69.100.

Yamamoto, Masaki: *See*—
Takanabe, Kazunori; Yamamoto, Masaki; Ito, Kenzo; and Fujinami, Hiroshi, 4,890,104, Cl. 340-995.000.
Yamamoto, Osamu: *See*—
Noguchi, Masahiro; and Yamamoto, Osamu, 4,889,586, Cl. 156-636.000.
Yamamoto, Shinya; and Saito, Koichi, to Murata Manufacturing Co., Ltd. Cassette for storing a plurality of electronic component chips. 4,889,229, Cl. 206-328.000.
Yamamoto, Sho: *See*—
Ikeda, Shuji; Nagasawa, Kouichi; Meguro, Satoshi; and Yamamoto, Sho, 4,890,148, Cl. 357-45.000.
Yamamoto, Tetsuya: *See*—
Kimura, Keita; Takatsu, Norihiko; and Yamamoto, Tetsuya, 4,890,166, Cl. 358-228.000.
Yamamoto, Tohru. Composite substance and a method for the production of the same. 4,889,876, Cl. 522-135.000.
Yamana, Keiichi: *See*—
Watanabe, Izumi; and Yamana, Keiichi, 4,889,296, Cl. 242-199.000.
Yamanami, Tsuguya: *See*—
Taguchi, Yoshinori; and Yamanami, Tsuguya, 4,890,096, Cl. 340-712.000.
Yamanoi, Hiroshi: *See*—
Uedaira, Satoru; Suzuki, Masayuki; Yamanoi, Hiroshi; and Tamura, Hidemasa, 4,889,706, Cl. 423-593.000.
Yamaoka, Masayoshi; Tsutsui, Kiyomi; Inoue, Tadashi; and Takahashi, Toyoki, to Nippon Steel Corporation. Apparatus for measuring reduction ratio of rolled material. 4,888,993, Cl. 73-760.000.
Yamaoka, Yukio: *See*—
Fujiwara, Tadayoshi; Yamaoka, Yukio; Hamada, Kazuichi; Yamada, Yoshiro; Kawaguchi, Yasunobu; Oki, Yasuhiro; Taniguchi, Takashi; and Takahashi, Hiroyuki, 4,889,567, Cl. 148-12.00B.
Yamashita, Akinori: *See*—
Hitomi, Mitsuo; Yuzuriha, Yasuhiro; Hattori, Toshihiko; and Yamashita, Akinori, 4,889,082, Cl. 123-52.00M.
Yamashita, Ichiro; and Takeda, Mamoru, to Matsushita Electric Industrial Co., Ltd. Active matrix circuit for liquid crystal displays. 4,890,097, Cl. 340-719.000.
Yamashita, Kasane: *See*—
Fukushima, Tsutomu; Nakao, Tsugio; Yamashita, Kasane; Komuro, Takao; and Nishi, Katsuhiro, 4,889,697, Cl. 423-140.000.
Yamashita, Masaaki: *See*—
Adaniya, Takeshi; Yamashita, Masaaki; Kubota, Takahiro; Enatsu, Akira; Nikaido, Norio; Miyosawa, Yoshiaki; and Nishimoto, Tadashi, 4,889,775, Cl. 428-62.00B.
Yamashita, Yoshio: *See*—
Kaifu, Katsuaki; Kosuge, Maki; Yamashita, Yoshio; Asano, takateru; and Kobayashi, Kenji, 4,889,795, Cl. 430-326.000.
Yamato, Yoshiro, to Shimano Industrial Company Limited. Fishing line guide. 4,888,906, Cl. 43-24.000.
Yamazaki, Etsuo, to Fanuc Ltd. Laser oscillator control circuit. 4,890,291, Cl. 372-38.000.
Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Electrostatic photocopying machine. 4,889,782, Cl. 430-57.000.
Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Printing member for electrostatic photocopying. 4,889,783, Cl. 430-57.000.
Yamazaki, Takashi, to Johoku Industries Ltd. Masking paper. 4,889,759, Cl. 428-181.000.
Yanagi, Tadashi: *See*—
Nishimae, Junichi; Yoshizawa, Kenji; Taki, Masakazu; Ueda, Yoshihiro; Yanagi, Tadashi; and Iwata, Akihiko, 4,890,294, Cl. 372-57.000.
Yang, Wen-Ching; Lee, Suh Y.; and Ettehadieh, Bozorg, to Westinghouse Electric Corp. Heat recovery boiler. 4,889,058, Cl. 110-214.000.
Yarkovsky, Joseph M.: *See*—
Gurak, Nur R.; Thompson, Ronald J.; Russell, James P.; and Yarkovsky, Joseph M., 4,889,670, Cl. 264-50.000.
Yates, John B., III, to General Electric Company. Trialkylamine salt-functionalized polyphenylene ethers methods for their preparation, and compositions containing them. 4,889,889, Cl. 525-92.000.
Yau, Robert L.: *See*—
Chuang, Patrick T.; Yau, Robert L.; Yoshida, Hiroshi; and Wang, Moon-Yee, 4,890,260, Cl. 365-49.000.
Yeda Research & Development Co., Ltd.: *See*—
Revel, Michel; Rubinstein, Menachem; and Mory, Yvez, 4,889,803, Cl. 435-69.510.
Yellin, Haim: *See*—
Kasan, Rodney; Seiffe, Michael; and Yellin, Haim, 4,889,724, Cl. 424-649.000.
Vaya, Jacob; Ladkani, David; Schoenberger, Clara; Kaspi, Joseph; Salemnick, Gad; Yellin, Haim; and Cherkez, Stephan, 4,889,929, Cl. 540-318.000.
Yen, Craig S., to Hughes Simulation Systems, Inc. Data compression and decompression for digital radar landmass simulation. 4,890,249, Cl. 364-578.000.
Yerkes, Patricia J. Stand for a shorthand machine. 4,889,301, Cl. 248-124.000.
Yerushalmi, Yaakov, to Koor Metals Ltd. Blast-resistant container. 4,889,258, Cl. 220-429.000.
Yescheskel, Herzel B.; Alon, Gad; and Beck, Eliezer, to Shenkar College of Textile Technology and Fashion, The. Treatment of cotton. 4,888,856, Cl. 19-0.270.
Yokoi, Gunpei, to Nintendo Co., Ltd. Rhythm recognizing apparatus and responsive toy. 4,889,027, Cl. 84-635.000.
Yokoi, Koichi: *See*—
Nakamura, Susumu; and Yokoi, Koichi, 4,889,480, Cl. 425-577.000.
Yokoshima, Minoru; and Ohkubo, Tetsuo, to Nippon Kayaku Kabushiki Kaisha. Novel silicon-urethane (meth) acrylate, and resin composition and coating material comprising same. 4,889,768, Cl. 428-429.000.
Yokouchi, Hisatake: *See*—
Umetani, Keiji; Ueda, Ken; Suzuki, Ryuichi; and Yokouchi, Hisatake, 4,890,310, Cl. 378-82.000.
Yokoyama, Fumitomo: *See*—
Kuwayama, Yoshinari; Yokoyama, Fumitomo; and Miura, Masakatsu, 4,889,016, Cl. 74-868.000.
Yokoyama, Kenji; Nakayama, Masatoshi; Shimozawa, Toru; Ueda, Kunihiro; and Maruta, Fumio, to TDK Corporation. Magnetic recording medium. 4,889,767, Cl. 428-336.000.
Yokoyama, Naoki: *See*—
Ishii, Kazuaki; Futatsugi, Toshiro; Oshima, Toshio; Fujii, Toshio; Yokoyama, Naoki; and Shibatomi, Akihiro, 4,889,831, Cl. 437-184.000.
Yokoyama, Yutaka: *See*—
Naitoh, Kazumi; Arakawa, Yoshiaki; Ikezaki, Takashi; Yabe, Shoji; Yokoyama, Yutaka; Hamaguchi, Yuichi; Roppongi, Yasunobu; and Hamaguchi, Yuichi, 4,889,536, Cl. 29-570.100.
Yokozawa, Seiichi, to Pioneer Electronic Corporation. Digital signal reproducing apparatus with capstan servo control based on adjacent track pilot signal crosstalk adjustment. 4,890,173, Cl. 360-77.150.
Yomoto, Masahiko; Uehara, Makoto; Ichikawa, Hajime; and Kato, Shigeru, to Nikon Corporation. Method for measuring temperature of semiconductor substrate and apparatus therefor. 4,890,245, Cl. 364-557.000.
Yoneda, Robert: *See*—
Seth-Smith, Nigel; Bates, Cameron; Lim, Samson; Rassel, William van; Yoneda, Robert; and Lucas, Keith, 4,890,319, Cl. 380-5.000.
Seth-Smith, Nigel; Bates, Cameron; Lim, Samson; van Rassel, William; Yoneda, Robert; and Lucas, Keith, 4,890,321, Cl. 380-20.000.
Yonemura, Masao: *See*—
Yumoto, Hideaki; Yonemura, Masao; and Yamada, Yoshito, 4,888,978, Cl. 73-40.000.
Yonenaga, Hitoshi: *See*—
Sasaki, Hideki; Matsuoka, Shigeru; Matsuda, Eiji; Yonenaga, Hitoshi; and Fukushima, Masahito, 4,890,256, Cl. 364-900.000.
Yoshida, Hiroshi, to Yoshida Kogyo K. K. Method and apparatus for treating elongate textile materials. 4,888,839, Cl. 8-149.100.
Yoshida, Hiroshi: *See*—
Chuang, Patrick T.; Yau, Robert L.; Yoshida, Hiroshi; and Wang, Moon-Yee, 4,890,260, Cl. 365-49.000.
Yoshida, Kazushi: *See*—
Ogawa, Ryota; Toji, Shigeo; Yoshida, Kazushi; and Okura, Zenichi, 4,890,133, Cl. 354-402.000.
Yoshida Kogyo K. K.: *See*—
Yoshida, Hiroshi, 4,888,839, Cl. 8-149.100.
Yoshida Kogyo K.K.: *See*—
Horita, Yoshiyuki, 4,888,859, Cl. 24-389.000.
Kasai, Kazumi, 4,888,858, Cl. 24-163.00R.
Yoshida, Masakazu: *See*—
Jindai, Hideo; Bando, Keiji; Yoshida, Masakazu; and Yamada, Hideki, 4,889,466, Cl. 414-694.000.
Yoshida, Shinki, to Sharp Kabushiki Kaisha. Peripheral machine for programmable controller. 4,890,243, Cl. 364-550.000.
Yoshida, Suguru: *See*—
Obata, Keiichi; Yoshida, Suguru; Saitoh, Masahiro; and Ono, Yoshinobu, 4,889,678, Cl. 264-313.000.
Yoshida, Toshio: *See*—
Takei, Hisashi; Ohmura, Hiroshi; Ushiro, Seimei; Mochida, Mitsuyoshi; Nakamura, Yoshihiko; Asano, Seiji; and Yoshida, Toshio, 4,890,130, Cl. 354-288.000.
Yoshikawa, Akihisa; Tajima, Masamichi; Watanabe Kunio; and Sato, Toshiharu, to SMC Corporation. Speed reducer for pneumatic actuator. 4,889,036, Cl. 91-403.000.
Yoshimi, Ishikawa, to Honda Giken Kogyo Kabushiki Kaisha. Rear wheel holding mechanism for a motorcycle. 4,889,205, Cl. 180-227.000.
Yoshimi, Satoshi; and Koga, Yoichiro, to Daiken Trade & Industry Co., Ltd. Floating floor. 4,888,927, Cl. 52-303.000.
Yoshimura, Narihiko; Tomizawa, Hirotaka; and Komatsu, Yasuji, to Toa Nenryo Kogyo, K.K. Synthetic traction fluid. 4,889,650, Cl. 252-79.000.
Yoshimura, Ryoichi; Torii, Shumpeita; and Yamada, Naoto, to Fuji Photo Film Co., Ltd. Cassette for image information recording carrier, mechanism for removing image information recording carrier from the cassette, and apparatus for reading image information. 4,889,989, Cl. 250-327.200.
Yoshinori, Koshida; Minoru, Isobe; and Shin-ichi, Suto, to Oki Electric Industry Co., Ltd. Automatic money depositing apparatus. 4,889,220, Cl. 194-206.000.
Yoshitomi Pharmaceutical Industries, Ltd.: *See*—
Araki, Kazuhiko; Kuroda, Tsuyoshi; Uemori, Satoru; Moriguchi, Akihiko; and Ikeda, Yoshifumi, 4,889,857, Cl. 514-235.200.
Yoshizawa, Kenji: *See*—
Nishimae, Junichi; Yoshizawa, Kenji; Taki, Masakazu; Ueda, Yoshihiro; Yanagi, Tadashi; and Iwata, Akihiko, 4,890,294, Cl. 372-57.000.

Yotsumoto, Masahiro: *See*—
Tazawa, Toshiaki; Yotsumoto, Masahiro; Tanahashi, Hiroshi; and Wakabayashi, Yuzuru, 4,889,743, Cl. 426-495.000.

Young, Charles E.: *See*—
Gruen, Dieter M.; Young, Charles E.; and Pellin, Michael J., 4,889,987, Cl. 250-282.000.

Young Industries, Inc., The: *See*—
Heyl, Robert D., 4,889,452, Cl. 406-85.000.

Young, James R.; and Moy, Michael, to Storage Technology Corporation. Encoded label having redundant and scrambled indicia for identifying a magnetic tape cartridge. 4,889,982, Cl. 235-494.000.

Young, Jeffrey L.: *See*—
Hult, David R.; and Young, Jeffrey L., 4,888,849, Cl. 15-327.00F.

Yu, Stella S. T.: *See*—
Djuric, Stevan W.; Shone, Robert L.; and Yu, Stella S. T., 4,889,871, Cl. 514-456.000.

Yuasa, Tetsuya: *See*—
Utsumi, Kenichi; Yuasa, Tetsuya; Goto, Yasuyuki; Tsugawa, Iwao; and Koshino, Nagaaki, 4,889,746, Cl. 427-162.000.

Yuhas, John M.; Goodman, Robert L.; and Moore, Robert E., to Adamantech, Inc. Sensitization of hypoxic tumor cells and control of growth thereof. 4,889,525, Cl. 600-1.000.

Yumoto, Hideaki; Yonemura, Masao; and Yamada, Yoshito, to TLV Co., Ltd. Instrument to measure leakage of steam from a steam trap. 4,888,978, Cl. 73-40.000.

Yuzuriha, Yasuhiro: *See*—
Hitomi, Mitsuo; Yuzuriha, Yasuhiro; Hattori, Toshihiko; and Yamashita, Akinori, 4,889,082, Cl. 123-52.00M.

Zachry, Kathy W., to DeRoyal Industries. Package of strung medical sponges. 4,889,230, Cl. 206-362.000.

Zahlaus, Helmut, to Heinz RUHL. Tooling assembly for rod material. 4,889,467, Cl. 414-746.200.

Zahler, Robert: *See*—
Godfrey, Jollie D.; Mueller, Richard H.; and Zahler, Robert, 4,889,930, Cl. 540-363.000.

Zahn, Irwin, to Autosplice, Inc. Method and apparatus for surface mounting terminals. 4,889,277, Cl. 228-180.200.

Zaidan Hojin Biseibutsu Kagaku Kenkyu Kai: *See*—
Machinami, Tomoya; Nakamura, Takeshi; Nishihata, Ken; Kondo, Shinichi; and Takeuchi, Tomio, 4,889,926, Cl. 536-6.400.

Zambrano, Raffaele: *See*—
Musumeci, Salvatore; and Zambrano, Raffaele, 4,889,822, Cl. 437-31.000.

Zapata, Richard: *See*—
Pelloux-Gervais, Pierre; Zapata, Richard; and Bres, Michel, 4,889,113, Cl. 128-201.250.

Zapfel, Horst; and Cabelmann, Erich, to Maschinenfabrik Moenus-Turner gmbH. Throughfeed sammying press. 4,888,966, Cl. 69-41.000.

Zavracky, Paul M.: *See*—
Fan, John C. C.; and Zavracky, Paul M., 4,889,565, Cl. 136-256.000.

Zeiser, Peter; Kaiser, Helmut; and Rieger, Hansjorg, to RUD-Kettenfabrik Rieger & Dietz GmbH, u. Co. Anti-skid device for vehicle wheels. 4,889,172, Cl. 152-226.000.

Zeller, Henry O. Golf tee dispenser. 4,889,260, Cl. 221-197.000.

Zeller, Siegfried: *See*—
Pusch, Hermann; Zeller, Siegfried; Millionis, Konstantin; and Kresl, Hans, 4,889,323, Cl. 266-142.000.

Zellweger Uster AG: *See*—
Felix, Ernst, 4,888,944, Cl. 57-264.000.

Zeltron - Instituto Zanussi per la Ricerca S.p.A.: *See*—
Baggio, Dino; and Boscolo, Antonio, 4,890,244, Cl. 364-551.010.

Zemke, Steven C.: *See*—
Taylor, David B.; and Zemke, Steven C., 4,889,959, Cl. 174-35.0GC.

Zepernick, Dean E.; Olson, Donald R.; and Scott, Robert D., to Hunt Valve Company. Combo fluid valve. 4,889,153, Cl. 137-269.000.

Zethraeus, Malin C.: *See*—
Andersson, Birgitta S.; Zethraeus, Malin C.; Herngren, Torbjorn; and Gustafsson, Jan-Erik V., 4,889,592, Cl. 162-29.000.

Zhaag, aixun. High sensitivity measurement device for measuring various parameters of non-electric quantity. 4,888,987, Cl. 73-204.140.

Zimba, Kenneth P. Dictionary game. 4,889,344, Cl. 273-243.000.

Zimmermann, Jurgen: *See*—
Beyer, Hans-Ernst; Bonitz, Jorg; Entenmann, Robert; Forster, Siegmar; Knab, Rochus; Kunzel, Walter; Kugler, Wolfgang; Mahlberg, Alfred; Miller, Bernhard; Philipp, Matthias; Rohde, Siegfried; Unland, Stefan; Viess, Walter; Winter, Herbert; and Zimmermann, Jurgen, 4,889,094, Cl. 123-414.000.

Zirps, Wilhelm, to Robert Bosch GmbH. Re-aspiration valve for master brake cylinders. 4,888,952, Cl. 60-589.000.

Zoller-Kipper GmbH: *See*—
Naab, Jakob; and Gajewski, Arno, 4,889,462, Cl. 414-408.000.

Zolnowsky, John: *See*—
Cruess, Michael W.; Moyer, William C.; and Zolnowsky, John, 4,890,223, Cl. 364-200.000.

Zrschizky, Helmut: *See*—
Klement, Ekkehard; Schneider, Hartmut; Karstensen, Holger; and Zrschizky, Helmut, 4,889,401, Cl. 350-96.120.

Zscheile, John W., Jr.; Lundquist, Alan E.; and Spencer, Billie M., to Unisys Corp. Burst jammer erasure circuit for spread spectrum receivers. 4,890,297, Cl. 375-1.000.

Zucker, Joseph; Shen, Nelson M.; Campbell, Bruce D.; Rodhe, Peder; and Call, Tom, to Raychem Corp. Distribution optical fiber tap. 4,889,403, Cl. 350-96.150.

Zuehlke, Rainer: *See*—
Klein, Klaus; Pollmann, Kurt; Schettler, Helmut; Schulz, Uwe; Wagner, Otto M.; and Zuehlke, Rainer, 4,890,238, Cl. 364-491.000.

Zurcher, Erwin: *See*—
Cottenceau, Remi; and Zurcher, Erwin, 4,888,943, Cl. 57-22.000.

Zwagemakers, Johannes M. A.: *See*—
Van Wijngaarden, Ineke; Zwagemakers, Johannes M. A.; and Van Dijk, Jan, 4,889,849, Cl. 514-218.000.

Zwier, Jan, to U.S. Philips Corp. Semiconductor cathode with increased stability. 4,890,031, Cl. 313-409.000.

ZymoGenetics, Inc.: *See*—
Murray, Mark J.; and Kelly, James D., 4,889,919, Cl. 530-351.000.

501 Reed Tool Co., Ltd.: *See*—
Fuller, John; and Gasan, Joseph A., 4,889,017, Cl. 76-108.00A.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 26TH DAY OF DECEMBER, 1989

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Allen, John H.: *See*—
Johnson, Gerald L.; Nolting, Eugene C.; and Allen, John H., Re. 33,134, Cl. 101-109.000.

BancTec, Inc.: *See*—
Johnson, Gerald L.; Nolting, Eugene C.; and Allen, John H., Re. 33,134, Cl. 101-109.000.

Cooper Industries, Inc.: *See*—
Gurevich, Leon; and Spaunhorst, Vernon R., Re. 33,137, Cl. 337-255.000.

Courrege, Claude, to Rippes S.A. Burner for gas blow torch. Re. 33,136, Cl. 431-329.000.

Gurevich, Leon; and Spaunhorst, Vernon R., to Cooper Industries, Inc. Subminiature fuse. Re. 33,137, Cl. 337-255.000.

Johnson, Gerald L.; Nolting, Eugene C.; and Allen, John H., to BancTec, Inc. High speed document encoding system. Re. 33,134, Cl. 101-109.000.

Nolting, Eugene C.: *See*—
Johnson, Gerald L.; Nolting, Eugene C.; and Allen, John H., Re. 33,134, Cl. 101-109.000.

Recovery Engineering: *See*—
Wanner, William F., Sr., deceased; and Wanner, William F., Jr., trustee, Re. 33,135, Cl. 417-377.000.

Rippes S.A.: *See*—
Courrege, Claude, Re. 33,136, Cl. 431-329.000.

Spaunhorst, Vernon R.: *See*—
Gurevich, Leon; and Spaunhorst, Vernon R., Re. 33,137, Cl. 337-255.000.

Wanner, William F., Jr., trustee: *See*—
Wanner, William F., Sr., deceased; and Wanner, William F., Jr., trustee, Re. 33,135, Cl. 417-377.000.

Wanner, William F., Sr., deceased; and Wanner, William F., Jr., trustee, to Recovery Engineering. Pump apparatus. Re. 33,135, Cl. 417-377.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Kugele, Thomas G., to Morton Thiokol Inc. Sulfide containing stabilizers. B1 4,062,881, 12-26-89, Cl. 260-399.000.

Morton Thiokol Inc.: *See*—
Kugele, Thomas G., B1 4,062,881, Cl. 260-399.000.

LIST OF DESIGN PATENTEES

Agren, Leif: *See*—
Bengtsson, Per A. B.; and Agren, Leif, 305,264, Cl. D26-23.000.

Allgeier, David M. J., to NCR Corporation. Bar code scanner or similar article. 305,228, 12-26-89, Cl. D14-107.000.

Amoco Corporation: *See*—
Esau, Norman D., 305,209, Cl. D10-96.000.

Anderson, Bruce: *See*—
Bush, Paul S.; Bova, Richard; and Anderson, Bruce, 305,186, Cl. D6-436.000.

Apple Computer, Inc.: *See*—
Esslinger, Hartmut H., 305,227, Cl. D14-100.000.

Arcair Company, The: *See*—
Johnson, David E., 305,202, Cl. D8-70.000.

Arduini, Giovanni; Bonfanti, Lorenzo; and Salvemini, Gianfranco, to Delta Elettronics s.p.a. Combined key holder and remote control transmitter for antitheft apparatus. 305,180, 12-26-89, Cl. D3-62.000.

Arduini, Giovanni; Bonfanti, Lorenzo; and Salvemini, Gianfranco, to Delta Elettronics s.p.a. Combined key holder and remote control transmitter for antitheft apparatus. 305,210, 12-26-89, Cl. D3-62.000.

Arns, Stefan; and Rosenblad, Lars-Goran, to Isaberg AB. Stapler. 305,200, 12-26-89, Cl. D8-50.000.

Aronsson, Joachim S.; Leander, Oskar W.; and Melin, Erik R., to Rotech Tooling AB. Driving unit for an electrode shaping device. 305,238, 12-26-89, Cl. D15-139.000.

Artform Industries: *See*—
Wasserman, Steven, 305,191, Cl. D7-1.000.

Aucoin, Tommy, to Redemptorist Vice-Provincialate of New Orleans, Inc. Cruciform key medal. 305,216, 12-26-89, Cl. D11-105.000.

Avent Medical Limited: *See*—
Hobbs, Michael A., 305,261, Cl. D24-9.000.

Bastyr, Charles A.: *See*—
Ross, Stephen O.; and Bastyr, Charles A., 305,208, Cl. D10-46.000.

Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., to Dart Industries Inc. Toy rhinoceros or the like. 305,251, 12-26-89, Cl. D21-148.000.

Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., to Dart Industries Inc. Toy elephant or the like. 305,254, 12-26-89, Cl. D21-162.000.

Bellini, Mario, to Ing. C. Olivetti & C., S.p.A. Printing ribbon cartridge. 305,242, 12-26-89, Cl. D18-12.000.

Bellini, Mario, to Ing. C. Olivetti & C., S.p.A. Printing ribbon cartridge. 305,243, 12-26-89, Cl. D18-12.000.

Bendickson, Roy B.; and Seaton, Robert A., to Fiskars Oy Ab. Knife. 305,257, 12-26-89, Cl. D22-118.000.

Bengtsson, Per A. B.; and Agren, Leif. Automatic candle snuffer. 305,264, 12-26-89, Cl. D26-23.000.

Bonfanti, Lorenzo: *See*—
Arduini, Giovanni; Bonfanti, Lorenzo; and Salvemini, Gianfranco, 305,180, Cl. D3-62.000.
Arduini, Giovanni; Bonfanti, Lorenzo; and Salvemini, Gianfranco, 305,210, Cl. D3-62.000.

Bova, Richard: *See*—
Bush, Paul S.; Bova, Richard; and Anderson, Bruce, 305,186, Cl. D6-436.000.

Brandsma, Sies K., to U.S. Philips Corporation. Radio receiver. 305,234, 12-26-89, Cl. D14-194.000.

Breiding, Gregory S.; and Bruns, Eugene G., to Crown Equipment Corporation. Steering wheel. 305,223, 12-26-89, Cl. D12-176.000.

Bruns, Eugene G.: *See*—
Breiding, Gregory S.; and Bruns, Eugene G., 305,223, Cl. D12-176.000.

Bush Industries, Inc.: *See*—
Bush, Paul S.; Bova, Richard; and Anderson, Bruce, 305,186, Cl. D6-436.000.

Bush, Paul S.; Bova, Richard; and Anderson, Bruce, to Bush Industries, Inc. Video cabinet or similar article. 305,186, 12-26-89, Cl. D6-436.000.

Bybee, Gary L. Lure. 305,258, 12-26-89, Cl. D22-132.000.

Campbell, Corene G. Two finger ring. 305,214, 12-26-89, Cl. D11-26.000.

Campbell, Leslie A. Sandal. 305,176, 12-26-89, Cl. D2-270.000.

Canon Kabushiki Kaisha: *See*—
Kondoh, Yuji, 305,240, Cl. D16-202.000.

Carter, Raymond M.; Violand, Thomas E., Jr.; and Pelly, Charles W., to Westinghouse Electric Corp. Armchair. 305,183, 12-26-89, Cl. D6-366.000.

Cheng, Chih-Ping. Lipstick container. 305,268, 12-26-89, Cl. D28-88.000.

Chuang, C. H., to Pioneer Industrial Corp. Cap for writing tools. 305,245, 12-26-89, Cl. D19-57.000.

Chung, Liaw S. Fingernail clipper. 305,267, 12-26-89, Cl. D28-60.000.

Clairson International: *See*—
Remmers, Lee, 305,272, Cl. D34-42.000.

Coley, Bill G., to Lee Industries. Sofa. 305,184, 12-26-89, Cl. D6-381.000.

Collister, Kenneth D., to Miles Inc. Work station container. 305,179, 12-26-89, Cl. D3-30.100.

Combi Co., Ltd.: *See*—
Nakao, Shinroku; Ishii, Yoshiyasu; and Matsuda, Hiroaki, 305,218, Cl. D12-129.000.

Commonwealth of Puerto Rico: *See*—
Cruz, Juan E., 305,185, Cl. D6-426.000.

Crown Equipment Corporation: *See*—
Breiding, Gregory S.; and Bruns, Eugene G., 305,223, Cl. D12-176.000.

Cruz, Juan E., to Commonwealth of Puerto Rico. Computer work station. 305,185, 12-26-89, Cl. D6-426.000.

Cunanan, Oscar S. Emergency transport brace frame. 305,217, 12-26-89, Cl. D12-128.000.

Dart Industries Inc.: *See*—
Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., 305,251, Cl. D21-148.000.
Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., 305,254, Cl. D21-162.000.

De brey, Robert J. Lapel button. 305,215, 12-26-89, Cl. D11-99.000.

de Figueiredo, Nuno R. M. Multipolar electrical branch line connector. 305,226, 12-26-89, Cl. D13-28.000.

Delta Elettronics s.p.a.: *See*—
Arduini, Giovanni; Bonfanti, Lorenzo; and Salvemini, Gianfranco, 305,180, Cl. D3-62.000.
Arduini, Giovanni; Bonfanti, Lorenzo; and Salvemini, Gianfranco, 305,210, Cl. D3-62.000.

Dickerson, Nathan A. Restaurant building. 305,263, 12-26-89, Cl. D25-10.000.

Drew, Robert A.: *See*—
Peddada, Raju B.; and Drew, Robert A., 305,182, Cl. D5-53.000.

Durand, Jean-Jacques. Cup. 305,194, 12-26-89, Cl. D7-9.000.

Dyson, James, to Iona Appliances Inc./Appareils Inc. Vacuum cleaner. 305,269, 12-26-89, Cl. D32-22.000.

Ecosystems, Inc.: *See*—
Jackson, Victor L., 305,199, Cl. D8-14.000.

Enter Computer, Inc.: *See*—
Ross, Stephen O.; and Bastyr, Charles A., 305,208, Cl. D10-46.000.

Epoch Company, Ltd.: *See*—
Ukisu, Hiroshi, 305,247, Cl. D21-59.000.
Ukisu, Hiroshi, 305,248, Cl. D21-59.000.
Ukisu, Hiroshi, 305,249, Cl. D21-59.000.

Esau, Norman D., to Amoco Corporation. Flow indicator for a fuel dispenser. 305,209, 12-26-89, Cl. D10-96.000.

Essex Environmental Industries, Inc.: *See*—
Granberg, William J.; Wagner, Richard A.; and Hundt, Gary W., 305,259, Cl. D23-205.000.

Esslinger, Hartmut H., to Apple Computer, Inc. Computer housing. 305,227, 12-26-89, Cl. D14-100.000.

Ex-Design Corporation: *See*—
Kawasaki, Kazuo, 305,201, Cl. D8-57.000.

Fendi Paola & S.lle S.A.A.: *See*—
Masci, Roberto, 305,175, Cl. D2-25.000.

Fiskars Oy Ab: *See*—
Bendickson, Roy B.; and Seaton, Robert A., 305,257, Cl. D22-118.000.

Fuji Photo Film Co., Ltd.: *See*—
Fukuda, Hiroshi; and Fukuda, Masahiro, 305,241, Cl. D16-223.000.

Fukuda, Hiroshi; and Fukuda, Masahiro, to Fuji Photo Film Co., Ltd. Microfilm camera with reader-printer. 305,241, 12-26-89, Cl. D16-223.000.

Fukuda, Masahiro: *See*—
Fukuda, Hiroshi; and Fukuda, Masahiro, 305,241, Cl. D16-223.000.

Funabashi, Genichi; and Hayashi, Tetsuaki, to Kubota, Ltd. Agricultural tractor. 305,236, 12-26-89, Cl. D15-23.000.

Geib, Todd P. Combined tire valve stem and cap. 305,222, 12-26-89, Cl. D12-153.000.

Goodner, Douglas E.; Iorio, David V.; Pangburn, Thomas E.; Stoyer, Roy D.; and Worth, Ronald K., to International Business Machines Corporation. Access door for a computer printer. 305,244, 12-26-89, Cl. D18-18.000.

Granberg, William J.; Wagner, Richard A.; and Hundt, Gary W., to Essex Environmental Industries, Inc. Industrial container. 305,259, 12-26-89, Cl. D23-205.000.

Grindrod, Paul E.; and Reifein, Yolanda M., to Oscar Mayer Foods Corporation. Package. 305,205, 12-26-89, Cl. D9-418.000.

Grindrod, Paul E.: *See*—
Reifein, Yolanda M.; and Grindrod, Paul E., 305,204, Cl. D9-418.000.

Harvey, Thomas D.: *See*—
Winter, Russell K.; Harvey, Thomas D.; Savas, Nedim; and Kain, Richard S., 305,190, Cl. D6-567.000.

Hayashi, Tetsuaki: *See*—
Funabashi, Genichi; and Hayashi, Tetsuaki, 305,236, Cl. D15-23.000.

Hickman, John R.; and Kriska, Nickolas J., to Weatherchem Corporation. Two flap container cap. 305,206, 12-26-89, Cl. D9-449.000.

Hirschauer, Richard L. Nail file. 305,266, 12-26-89, Cl. D28-59.000.

Hobbs, Michael A., to Avent Medical Limited. Disinfection unit. 305,261, 12-26-89, Cl. D24-9.000.

Horn, Donald N., to Vicon Industries. Desk top monitor and control unit for a television surveillance system. 305,211, 12-26-89, Cl. D10-106.000.

Hosiden Electronics Co., Ltd.: *See*—
Iwashita, Masanori, 305,224, Cl. D13-24.000.
Komatsu, Yasuhiro, 305,225, Cl. D13-24.000.

Hughes, Thomas E. Road hazard warning sign. 305,213, 12-26-89, Cl. D10-109.000.

Hundt, Gary W.: *See*—
Granberg, William J.; Wagner, Richard A.; and Hundt, Gary W., 305,259, Cl. D23-205.000.

Igarashi, Yoshiaki: *See*—
Motta, Vincent C.; Yasui, Hiromasa; and Igarashi, Yoshiaki, 305,265, Cl. D28-48.000.

Ing. C. Olivetti & C., S.p.A.: *See*—
Bellini, Mario, 305,242, Cl. D18-12.000.
Bellini, Mario, 305,243, Cl. D18-12.000.

International Business Machines Corporation: *See*—
Goodner, Douglas E.; Iorio, David V.; Pangburn, Thomas E.; Stoyer, Roy D.; and Worth, Ronald K., 305,244, Cl. D18-18.000.

Iona Appliances Inc./Appareils Inc.: *See*—
Dyson, James, 305,269, Cl. D32-22.000.

Iorio, David V.: *See*—
Goodner, Douglas E.; Iorio, David V.; Pangburn, Thomas E.; Stoyer, Roy D.; and Worth, Ronald K., 305,244, Cl. D18-18.000.

Isaberg AB: *See*—
Arns, Stefan; and Rosenblad, Lars-Goran, 305,200, Cl. D8-50.000.

Ishii, Yoshiyasu: *See*—
Nakao, Shinroku; Ishii, Yoshiyasu; and Matsuda, Hiroaki, 305,218, Cl. D12-129.000.

Ishizawa, Takayuki, to Takara Co., Ltd. Reconfigurable toy tiger. 305,255, 12-26-89, Cl. D21-163.000.

Iwashita, Masanori, to Hosiden Electronics Co., Ltd. Electrical connector. 305,224, 12-26-89, Cl. D13-24.000.

Jackson, Victor L., to Ecosystems, Inc. Calculator button pusher. 305,199, 12-26-89, Cl. D8-14.000.

Janome Sewing Machine Co., Ltd.: *See*—
Kuroki, Nobufusa, 305,237, Cl. D15-69.000.

Johnson, David E., to Arcair Company, The. Multi-vial level attachment for hand-held drills. 305,202, 12-26-89, Cl. D8-70.000.

Kabushiki Kaisha Toshiba: *See*—
Sutoh, Shigeru, 305,231, Cl. D14-138.000.
Sutoh, Shigeru, 305,232, Cl. D14-138.000.

Kabushiki Kaisha Yoshikawa Kuni Kogyosho: *See*—
Yoshikawa, Toshimichi, 305,271, Cl. D34-40.000.
Yoshikawa, Toshimichi, 305,273, Cl. D34-42.000.
Yoshikawa, Toshimichi, 305,274, Cl. D34-40.000.

Kain, Richard S.: *See*—
Winter, Russell K.; Harvey, Thomas D.; Savas, Nedim; and Kain, Richard S., 305,190, Cl. D6-567.000.

Kangaroos U.S.A., Inc.: *See*—
Tonkel, Raymond F., 305,178, Cl. D2-315.000.

Kaufman, David T., Jr., to Lesco Design & Manufacturing Company, Inc. Bottle storage rack. 305,187, 12-26-89, Cl. D6-465.000.

Kawasaki, Kazuo, to Ex-Design Corporation. Scissors. 305,201, 12-26-89, Cl. D8-57.000.

Kemp, Ian, to SP Tyres UK Ltd. Vehicle tire. 305,220, 12-26-89, Cl. D12-142.000.

Kennametal Inc.: *See*—
Niebauer, Kenneth L., 305,239, Cl. D15-139.000.

Kimberly-Clark Corporation: *See*—
Peddada, Raju B.; and Drew, Robert A., 305,182, Cl. D5-53.000.
Veith, J. Steven, 305,181, Cl. D5-53.000.

Kirchhoff, Kenneth J.; and Nelson, Bruce E., to Minnesota Mining and Manufacturing Company. Desk organizer. 305,246, 12-26-89, Cl. D19-75.000.

Kokusai Denki Kabushiki Kaisha: *See*—
Sekine, Isamu, 305,233, Cl. D14-191.000.

Komatsu, Yasuhiro, to Hosiden Electronics Co., Ltd. Electrical connector. 305,225, 12-26-89, Cl. D13-24.000.

Kondoh, Yuji, to Canon Kabushiki Kaisha. Video camera. 305,240, 12-26-89, Cl. D16-202.000.

Kriska, Nickolas J.: *See*—
Hickman, John R.; and Kriska, Nickolas J., 305,206, Cl. D9-449.000.

Kubota, Ltd.: *See*—
Funabashi, Genichi; and Hayashi, Tetsuaki, 305,236, Cl. D15-23.000.

Kuroki, Nobufusa, to Janome Sewing Machine Co., Ltd. Sewing machine. 305,237, 12-26-89, Cl. D15-69.000.

L.A. Gear, Inc.: *See*—
Quan, Patricia D., 305,177, Cl. D2-314.000.

Leander, Oskar W.: *See*—
Aronsson, Joachim S.; Leander, Oskar W.; and Melin, Erik R., 305,238, Cl. D15-139.000.

Lee Industries: *See*—
Coley, Bill G., 305,184, Cl. D6-381.000.

Lesco Design & Manufacturing Company, Inc.: *See*—
Kaufman, David T., Jr., 305,187, Cl. D6-465.000.

Loesche, Ray. Perforated margin remover for computer paper or the like. 305,203, 12-26-89, Cl. D8-98.000.

Masci, Roberto, to Fendi Paola & S.lle S.A.A. Fur pelt for apparel or the like. 305,175, 12-26-89, Cl. D2-25.000.

Math Associates, Inc.: *See—*
Math, Irwin, 305,230, Cl. D14-124.000.

Math, Irwin, to Math Associates, Inc. Fiber optic video transmitter and receiver. 305,230, 12-26-89, Cl. D14-124.000.

Matsuda, Hiroaki: *See—*
Nakao, Shinroku; Ishii, Yoshiyasu; and Matsuda, Hiroaki, 305,218, Cl. D12-129.000.

Medical Research Laboratories: *See—*
Milani, Dean L., 305,229, Cl. D14-114.000.

Melin, Erik R.: *See—*
Aronsson, Joachim S.; Leander, Oskar W.; and Melin, Erik R., 305,238, Cl. D15-139.000.

Milani, Dean L., to Medical Research Laboratories. Computer fan. 305,229, 12-26-89, Cl. D14-114.000.

Miles Inc.: *See—*
Collister, Kenneth D., 305,179, Cl. D3-30.100.

Minamitani, Masaaki, to Ohtsu Tire & Rubber Co., Ltd., The. Vehicle tire. 305,221, 12-26-89, Cl. D12-147.000.

Minnesota Mining and Manufacturing Company: *See—*
Kirchhoff, Kenneth J.; and Nelson, Bruce E., 305,246, Cl. D19-75.000.

Mito, Yoshio, to Toyotomi Kogyo Co., Ltd. Electric radiant heater. 305,260, 12-26-89, Cl. D23-337.000.

Montgomery, Robert B., to Munnier Freres S.A. Toy animal. 305,253, 12-26-89, Cl. D21-161.000.

Moore, Don M. Telephone receiver cushion. 305,235, 12-26-89, Cl. D14-249.000.

Motta, Vincent C.; Yasui, Hiromasa; and Igarashi, Yoshiaki, to Warner-Lambert Company. Razor handle for use with a cartridge. 305,265, 12-26-89, Cl. D28-48.000.

Munnier Freres S.A.: *See—*
Montgomery, Robert B., 305,253, Cl. D21-161.000.

Nakao, Shinroku; Ishii, Yoshiyasu; and Matsuda, Hiroaki, to Combi Co., Ltd. Baby stroller. 305,218, 12-26-89, Cl. D12-129.000.

NCR Corporation: *See—*
Allgeier, David M. J., 305,228, Cl. D14-107.000.

Neilson, Bert: *See—*
Nielson, Keith E.; and Neilson, Bert, 305,252, Cl. D21-147.000.

Nelson, Bruce E.: *See—*
Kirchhoff, Kenneth J.; and Nelson, Bruce E., 305,246, Cl. D19-75.000.

Newton, Brian L.: *See—*
Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., 305,251, Cl. D21-148.000.
Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., 305,254, Cl. D21-162.000.

Nichols, Khipra, to Playschool Baby, Inc. Nasal aspirator. 305,262, 12-26-89, Cl. D24-60.000.

Niebauer, Kenneth L., to Kennametal Inc. Cutting tool insert. 305,239, 12-26-89, Cl. D15-139.000.

Nielson, Keith E.; and Neilson, Bert. Rubber band gun. 305,252, 12-26-89, Cl. D21-147.000.

Niskanen, Floyd D.: *See—*
White, John O.; and Niskanen, Floyd D., 305,198, Cl. D8-8.000.

Nottingham, John R.: *See—*
Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., 305,251, Cl. D21-148.000.
Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., 305,254, Cl. D21-162.000.

Ohtsu Tire & Rubber Co., Ltd., The: *See—*
Minamitani, Masaaki, 305,221, Cl. D12-147.000.

Oscar Mayer Foods Corporation: *See—*
Grindrod, Paul E.; and Reifein, Yolanda M., 305,205, Cl. D9-418.000.
Reifein, Yolanda M.; and Grindrod, Paul E., 305,204, Cl. D9-418.000.

Pangburn, Thomas E.: *See—*
Goodner, Douglas E.; Iorio, David V.; Pangburn, Thomas E.; Stoyer, Roy D.; and Worth, Ronald K., 305,244, Cl. D18-18.000.

Pearson, Bruce E. Tricep bar. 305,256, 12-26-89, Cl. D21-198.000.

Peddada, Raju B.; and Drew, Robert A., to Kimberly-Clark Corporation. Embossed tissue or similar article. 305,182, 12-26-89, Cl. D5-53.000.

Pelly, Charles W.: *See—*
Carter, Raymond M.; Violand, Thomas E., Jr.; and Pelly, Charles W., 305,183, Cl. D6-366.000.

Persoff, Paul. Combined pepper mill and salt shaker. 305,196, 12-26-89, Cl. D7-57.000.

Pioneer Industrial Corp.: *See—*
Chuang, C. H., 305,245, Cl. D19-57.000.

Playschool Baby, Inc.: *See—*
Nichols, Khipra, 305,262, Cl. D24-60.000.

Quan, Patricia D., to L.A. Gear, Inc. Shoe upper. 305,177, 12-26-89, Cl. D2-314.000.

Redemptorist Vice-Provincialate of New Orleans, Inc.: *See—*
Aucoin, Tommy, 305,216, Cl. D11-105.000.

Reifein, Yolanda M.; and Grindrod, Paul E., to Oscar Mayer Foods Corporation. Package. 305,204, 12-26-89, Cl. D9-418.000.

Reifein, Yolanda M.: *See—*
Grindrod, Paul E.; and Reifein, Yolanda M., 305,205, Cl. D9-418.000.

Remmers, Lee, to Clairson International. Shelf mounted storage basket. 305,272, 12-26-89, Cl. D34-42.000.

Rosenblad, Lars-Goran: *See—*
Arns, Stefan; and Rosenblad, Lars-Goran, 305,200, Cl. D8-50.000.

Ross, Stephen O.; and Bastyr, Charles A., to Enter Computer, Inc. Plotter. 305,208, 12-26-89, Cl. D10-46.000.

Rotech Tooling AB: *See—*
Aronsson, Joachim S.; Leander, Oskar W.; and Melin, Erik R., 305,238, Cl. D15-139.000.

Rowebottom, Howard G. Stop sign with lateral identification panels for cross traffic. 305,212, 12-26-89, Cl. D10-109.000.

Russell William, Ltd.: *See—*
Winter, Russell K.; Harvey, Thomas D.; Savas, Nedim; and Kain, Richard S., 305,190, Cl. D6-567.000.

Sajadieh, Morteza. Tumbler. 305,193, 12-26-89, Cl. D7-6.000.

Salvemini, Gianfranco: *See—*
Arduini, Giovanni; Bonfanti, Lorenzo; and Salvemini, Gianfranco, 305,180, Cl. D3-62.000.
Arduini, Giovanni; Bonfanti, Lorenzo; and Salvemini, Gianfranco, 305,210, Cl. D3-62.000.

Savas, Nedim: *See—*
Winter, Russell K.; Harvey, Thomas D.; Savas, Nedim; and Kain, Richard S., 305,190, Cl. D6-567.000.

Scherrer, Kurt, to U. Scharer Sohne AG (USM). Computer cable support rack for mounting under a desk top. 305,189, 12-26-89, Cl. D6-510.000.

Seaton, Robert A.: *See—*
Bendickson, Roy B.; and Seaton, Robert A., 305,257, Cl. D22-118.000.

Seikosha Co., Ltd.: *See—*
Wada, Mitsuo, 305,207, Cl. D10-15.000.

Sekine, Isamu, to Kokusai Denki Kabushiki Kaisha. Radio pager. 305,233, 12-26-89, Cl. D14-191.000.

SP Tyres UK Ltd.: *See—*
Kemp, Ian, 305,220, Cl. D12-142.000.

Spirk, John W.: *See—*
Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., 305,251, Cl. D21-148.000.
Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., 305,254, Cl. D21-162.000.

Stoyer, Roy D.: *See—*
Goodner, Douglas E.; Iorio, David V.; Pangburn, Thomas E.; Stoyer, Roy D.; and Worth, Ronald K., 305,244, Cl. D18-18.000.

Sutoh, Shigeru, to Kabushiki Kaisha Toshiba. Portable handset radio telephone. 305,231, 12-26-89, Cl. D14-138.000.

Sutoh, Shigeru, to Kabushiki Kaisha Toshiba. Mobile telephone set. 305,232, 12-26-89, Cl. D14-138.000.

Swanson, John W.: *See—*
Swanson, Pamela J.; and Swanson, John W., 305,270, Cl. D32-47.000.

Swanson, Pamela J.; and Swanson, John W. Ski boot scraper. 305,270, 12-26-89, Cl. D32-47.000.

Takara Co., Ltd.: *See—*
Ishizawa, Takayuki, 305,255, Cl. D21-163.000.

Tonkel, Raymond F., to Kangaroos U.S.A., Inc. Laminal tongue pocket for footwear. 305,178, 12-26-89, Cl. D2-315.000.

Toro Company, The: *See—*
White, John O.; and Niskanen, Floyd D., 305,198, Cl. D8-8.000.

Towers, Lawrence A. Drink coaster. 305,195, 12-26-89, Cl. D7-45.000.

Toyotomi Kogyo Co., Ltd.: *See—*
Mito, Yoshio, 305,260, Cl. D23-337.000.

U. Scharer Sohne AG (USM): *See—*
Scherrer, Kurt, 305,189, Cl. D6-510.000.

Ukisu, Hiroshi, to Epoch Company, Ltd. Simulative toy box. 305,247, 12-26-89, Cl. D21-59.000.

Ukisu, Hiroshi, to Epoch Company, Ltd. Simulative toy pencil sharpener. 305,248, 12-26-89, Cl. D21-59.000.

Ukisu, Hiroshi, to Epoch Company, Ltd. Simulative toy tape dispenser. 305,249, 12-26-89, Cl. D21-59.000.

U.S. Philips Corporation: *See—*
Brandsma, Sies K., 305,234, Cl. D14-194.000.

Valdes, Oscar R. Tortilla warmer. 305,197, 12-26-89, Cl. D7-354.000.

van Engeland, Willi, to 501 Staat Der Nederlanden. Table. 305,188, 12-26-89, Cl. D6-487.000.

van Erkel, Jan A. Party plate. 305,192, 12-26-89, Cl. D7-1.000.

Veith, J. Steven, to Kimberly-Clark Corporation. Embossed tissue or similar article. 305,181, 12-26-89, Cl. D5-53.000.

Vendetti, Peter. Model car. 305,250, 12-26-89, Cl. D21-136.000.

Vicon Industries: *See—*
Horn, Donald N., 305,211, Cl. D10-106.000.

Violand, Thomas E., Jr.: *See—*
Carter, Raymond M.; Violand, Thomas E., Jr.; and Pelly, Charles W., 305,183, Cl. D6-366.000.

Wada, Mitsuo, to Seikosha Co., Ltd. Travel alarm clock. 305,207, 12-26-89, Cl. D10-15.000.

Wagner, Richard A.: *See—*
Granberg, William J.; Wagner, Richard A.; and Hundt, Gary W., 305,259, Cl. D23-205.000.

Warner-Lambert Company: *See—*
Motta, Vincent C.; Yasui, Hiromasa; and Igarashi, Yoshiaki, 305,265, Cl. D28-48.000.

Wasserman, Steven, to Artform Industries. Cake and ice cream dish. 305,191, 12-26-89, Cl. D7-1.000.

Weatherchem Corporation: *See—*
Hickman, John R.; and Kriska, Nickolas J., 305,206, Cl. D9-449.000.

Westinghouse Electric Corp.: *See—*
Carter, Raymond M.; Violand, Thomas E., Jr.; and Pelly, Charles W., 305,183, Cl. D6-366.000.

White, John O.; and Niskanen, Floyd D., to Toro Company, The. Handle for an electric string trimmer or the like. 305,198, 12-26-89, Cl. D8-8.000.

Winter, Russell K.; Harvey, Thomas D.; Savas, Nedim; and Kain, Richard S., to Russell William, Ltd. Display shelf. 305,190, 12-26-89, Cl. D6-567.000.

Wolff, Martin J.: *See*—
Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., 305,251, Cl. D21-148.000.
Bateman, Robert F.; Newton, Brian L.; Wolff, Martin J.; Nottingham, John R.; and Spirk, John W., 305,254, Cl. D21-162.000.

Wood, Charles F. Arm rest engagable mounting bracket for wheelchairs or the like. 305,219, 12-26-89, Cl. D12-133.000.

Worth, Ronald K.: *See*—
Goodner, Douglas E.; Iorio, David V.; Pangburn, Thomas E.; Stoyer, Roy D.; and Worth, Ronald K., 305,244, Cl. D18-18.000.

Yasui, Hiromasa: *See*—
Motta, Vincent C.; Yasui, Hiromasa; and Igarashi, Yoshiaki, 305,265, Cl. D28-48.000.

Yoshikawa, Toshimichi, to Kabushiki Kaisha Yoshikawa Kuni Kogyosho. Basket. 305,271, 12-26-89, Cl. D34-40.000.

Yoshikawa, Toshimichi, to Kabushiki Kaisha Yoshikawa Kuni Kogyosho. Basket. 305,273, 12-26-89, Cl. D34-42.000.

Yoshikawa, Toshimichi, to Kabushiki Kaisha Yoshikawa Kuni Kogyosho. Basket. 305,274, 12-26-89, Cl. D34-40.000.

501 Staat Der Nederlanden: *See*—
van Engeland, Willi, 305,188, Cl. D6-487.000.

LIST OF PLANT PATENTEES

Garabedian, John M. Plum tree, Rancho Ocho. 7,082, 12-26-89, Cl. 38.000.

Hofmann, Christa, to Oglevee Ltd. Distinct variety of geranium plant named Fox. 7,083, 12-26-89, Cl. 68.000.

Hofmann, Christa, to Oglevee Ltd. Distinct variety of geranium plant named Cherry. 7,085, 12-26-89, Cl. 68.000.

Hofmann, Christa, to Oglevee Ltd. Distinct variety of geranium plant named Rebeca. 7,086, 12-26-89, Cl. 68.000.

Hofmann, Christa, to Oglevee Ltd. Distinct variety of geranium plant named Laura. 7,087, 12-26-89, Cl. 68.000.

Holtkamp, Reinhold, Sr. African violet plant named Decennie. 7,088, 12-26-89, Cl. 69.000.

Man, Jan, to Oglevee Ltd. Distinct variety of Begonia plant named Mariandel. 7,084, 12-26-89, Cl. 68.000.

Oglevee Ltd.: *See*—
Hofmann, Christa, 7,083, Cl. 68.000.
Hofmann, Christa, 7,085, Cl. 68.000.
Hofmann, Christa, 7,086, Cl. 68.000.
Hofmann, Christa, 7,087, Cl. 68.000.
Man, Jan, 7,084, Cl. 68.000.

CLASSIFICATION OF PATENTS

ISSUED DECEMBER 26, 1989

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

8 4,888,825
22 4,888,826
52 4,888,827
69.5 4,888,828
167 4,888,829
327 4,888,830
420 4,888,831

CLASS 4

321 4,888,832
480 4,888,833
540 4,888,834
609 4,888,835

CLASS 5

10 B 4,888,836
93 R 4,888,837
207 4,888,838

CLASS 8

149.1 4,888,839
151 4,888,840
639 4,889,535

CLASS 12

38 4,888,841

CLASS 15

1.7 4,888,842
98 4,888,843
106 4,888,844
182 4,888,845
236.01 4,888,846
263 4,888,847
306 A 4,888,848
327 F 4,888,849
359 4,888,850
371 4,888,851
400 4,888,852

CLASS 16

240 4,888,853
266 4,888,854

CLASS 17

1 A 4,888,855

CLASS 19

0.27 4,888,856
80 R 4,888,857

CLASS 24

163 R 4,888,858
389 4,888,859

CLASS 26

18.6 4,888,860

CLASS 29

25.35 4,888,861
148.4 A 4,888,862
156.8 B 4,888,863
568 4,888,865
570.1 4,889,536
598 4,888,866
753 4,888,864
846 4,889,961
857 4,888,867

CLASS 30

41 4,888,868
161 4,888,869
233.5 4,888,870
276 4,888,871
371 4,888,872

CLASS 33

1 SD 4,888,873
18.1 4,888,874
347 4,888,875
501.08 4,888,876
559 4,888,877
573 4,888,878
613 4,888,879
645 4,888,880
759 4,888,881

CLASS 34

10 4,888,882
32 4,888,884
33 4,888,885
104 4,888,886
116 4,888,883

CLASS 36

3 R 4,888,887
43 4,888,888
117 4,888,889

CLASS 37

103 4,888,890
222 4,888,891

CLASS 40

430 4,888,892
592 4,888,893
606 4,888,894
610 4,888,895
630 4,888,896
657 4,888,897

CLASS 42

49.01 4,888,898
50 4,888,899
4,888,900
51 4,888,901
90 4,888,902

CLASS 43

1 4,888,903
17.6 4,888,904
4,888,905
24 4,888,906
42.06 4,888,907
42.14 4,888,908
42.16 4,888,909
44.82 4,888,910
44.96 4,888,911

CLASS 44

53 4,889,537
90 4,889,538

CLASS 47

1.4 4,888,912
9 4,888,913
78 4,888,914

CLASS 48

61 4,889,539
77 4,889,540

CLASS 49

181 4,888,915
352 4,888,916
479 4,888,917
501 4,888,918
502 4,888,919

CLASS 52

12 4,888,920
63 4,888,921
124.2 4,888,922
200 4,888,923
217 4,888,924
232 4,888,925
291 4,888,926
303 4,888,927
387 4,888,928
400 4,888,929
410 4,888,930
426 4,888,931
748 4,888,932
779 4,888,933
807 4,888,934

CLASS 53

478 4,888,935
510 4,888,936
567 4,888,937
569 4,888,938

CLASS 55

16 4,889,541
97 4,889,542
4,889,543
218 4,889,544

CLASS 56

13.6 4,888,939
16.6 4,888,940
328.1 4,888,941
400.01 4,888,942

CLASS 57

22 4,888,943
264 4,888,944
4,888,945
267 4,888,946

CLASS 60

39.08 4,888,947
223 4,888,948
434 4,888,949
520 4,888,950
4,888,951
4,888,952
4,888,953
589 4,888,954
657
660

CLASS 62

24 4,889,545
47.1 4,888,955
51.1 4,888,956
84 4,888,957
237 4,888,958
244 4,888,959
298 4,888,960
398 4,888,961
503 4,888,962

CLASS 65

5 4,889,546
107 4,889,547
305 4,889,548
314 4,889,549

CLASS 66

151 4,888,963
193 4,888,964

CLASS 68

23.4 4,888,965

CLASS 69

41 4,888,966

CLASS 70

52 4,888,967
163 4,888,968
226 4,888,969
456 R 4,888,970

CLASS 71

86 4,889,550
88 4,889,551
92 4,889,552
4,889,553
118 4,889,554

CLASS 72

157 4,888,971
186 4,888,972
342 4,888,973
391 4,888,974
392 4,888,975

CLASS 73

10 4,888,976
38 4,888,977
40 4,888,978
40.7 4,888,979
49.2 4,888,980
60.1 4,888,981
81 4,888,982
104 4,888,983
105 4,888,984
150 A 4,888,985
188 4,888,986
204.14 4,888,987
204.26 4,888,988
304 C 4,888,989
326 4,888,990
658 4,888,991
727 4,888,992
760 4,888,993
4,888,994
859 4,888,995
862.19 4,888,996
862.65 4,888,997
864.21 4,888,998
864.65 4,888,999
865.8 4,889,000
865.9 4,889,001

CLASS 74

89.15 4,889,002
339 4,889,003
479 4,889,004
501.6 4,889,005
502.4 4,889,006
506 4,889,007
520 4,889,008
574 4,889,009
594.6 4,889,010
604 4,889,011
730 4,889,012
752 F 4,889,013
858 4,889,014
866 4,889,015
866 4,889,016

CLASS 75

0.5 R 4,889,555
10.22 4,889,556
249 4,889,557

CLASS 76

108 A 4,889,017

CLASS 81

3.43 4,889,018
9.4 4,889,019
119 4,889,020
325 4,889,021
368 4,889,022

CLASS 82

92 4,889,023
127 4,889,024

CLASS 83

835 4,889,025

CLASS 84

421 4,889,028
454 4,889,029
611 4,889,026
635 4,889,027

CLASS 89

1.14 4,889,030
33.2 4,889,031
129.01 4,889,032

CLASS 91

6 4,889,033
218 4,889,034
275 4,889,035
403 4,889,036

CLASS 92

78 4,889,037
110 4,889,038
140 4,889,039

CLASS 96

121.2 4,889,040

CLASS 99

285 4,889,041
340 4,889,042
450.2 4,889,043
510 4,889,044
546 4,889,045
4,889,046

CLASS 100

87 4,889,047
93 RP 4,889,048
171 4,889,049

CLASS 101

38.1 4,889,050
77 4,889,051
93.04 4,889,052
109 Re.33,134

CLASS 102

348 4,889,053

CLASS 105

167 4,889,054
355 4,889,055
377 4,889,056

CLASS 106

14.12 4,889,558
21 4,889,559
27 4,889,560
196 4,889,561
204 4,889,562
287.17 4,889,563

CLASS 108

42 4,889,057

CLASS 110

214 4,889,058
246 4,889,059
4,889,060
336 4,889,061

CLASS 112

318 4,889,062
402 4,889,063

CLASS 114

89 4,889,064
293 4,889,065
334 4,889,066

CLASS 116

63 C 4,889,067
203 4,889,068

CLASS 118

50 4,889,069
64 4,889,070
126 4,889,071
244 4,889,072

CLASS 119

14.03 4,889,074
23 4,889,075
50 4,889,076
51.11 4,889,077
53.5 4,889,078

CLASS 123

41.82 R 4,889,079
4,889,080
52 M 4,889,081
4,889,082
52 MV 4,889,083
90.12 4,889,084
4,889,085
90.15 4,889,086
90.31 4,889,087
188 B 4,889,088
195 HC 4,889,089
197 AC 4,889,090
219 4,889,091
381 4,889,092
400 4,889,093
414 4,889,094
418 4,889,095
450 4,889,096
478 4,889,097
489 4,889,098
4,889,099
492 4,889,100
494 4,889,101

CLASS 124

88 4,889,102

CLASS 126

92 AC 4,889,103
299 R 4,889,104
361 4,889,105

CLASS 128

4 4,889,106
20 4,889,107
25 R 4,889,108
80 A 4,889,109
200.26 4,889,112
201.25 4,889,113
203.15 4,889,114
204.23 4,889,116
204.26 4,889,115
381 4,889,121
399 4,889,122
419 F 4,889,111
644 4,889,123
653 4,889,124
4,889,125
4,889,126
4,889,127
662.06 4,889,128
664 4,889,129
670 4,889,130
671 4,889,131
680 4,889,132
681 4,889,133
696 4,889,134
849 4,889,135
855 4,889,136
898 4,889,137

CLASS 131

84.1 4,889,138
84.3 4,889,139
281 4,889,140
309 4,889,142
331 4,889,143
337 4,889,144
365 4,889,145

CLASS 122

286 4,889,141

CLASS 134

21 4,889,564
64 R 4,889,146
123 4,889,147

CLASS 136

256 4,889,565

CLASS 137

1 4,889,148
4,889,149
39 4,889,150
71 4,889,151
113 4,889,152
269 4,889,153
312 4,889,155
454.5 4,889,157
474 4,889,154
484.4 4,889,158
508 4,889,159
516.13 4,889,156
588 4,889,160
596 4,889,161
606 4,889,162
625.32 4,889,163
625.64 4,889,164
801 4,889,165
813 4,889,166

CLASS 138

99 4,889,167
103 4,889,168

CLASS 144

208 J 4,889,169

CLASS 148

2 4,889,566
12 B 4,889,567
12.7 A 4,889,582
108 4,889,568
130 4,889,569
407 4,889,170

CLASS 149

7 4,889,570
19.9 4,889,571

CLASS 150

166 4,889,171

CLASS 152

226 4,889,172
528 4,889,173
529 4,889,174

CLASS 156

63 4,889,572
89 4,889,573
108 4,889,574
189 4,889,575
249 4,889,576
281 4,889,577
294 4,889,578
305 4,889,579
382 4,889,580
443 4,889,581
604 4,889,583
630 4,889,584
4,889,585
636 4,889,586
643 4,889,587
4,889,588
646 4,889,589
647 4,889,590

CLASS 160

90 4,889,175
264 4,889,176

CLASS 162

20 4,889,591
29 4,889,592
49 4,889,593

130 4,889,594
157.6 4,889,595
4,889,596
4,889,597
199 4,889,598
263 4,889,599

CLASS 164

97 4,889,177
448 4,889,178

CLASS 165

14 4,889,179
30 4,889,180
78 4,889,181
134.1 4,889,182

CLASS 166

55 4,889,183
80 4,889,184
243 4,889,185
252 4,889,186
298 4,889,187

CLASS 168

13 4,889,188

CLASS 169

73 4,889,189

CLASS 172

49.5 4,889,190

CLASS 173

1 4,889,191
22 4,889,192

CLASS 174

35 GC 4,889,959
35 MS 4,889,958
52.4 4,889,960
68.5 4,889,962
129 R 4,889,963

CLASS 175

62 4,889,193
65 4,889,194
107 4,889,195
209 4,889,196
267 4,889,197
304 4,889,198
317 4,889,199
394 4,889,200

CLASS 177

25.14 4,889,201
134 4,889,202

CLASS 180

69.24 4,889,203
197 4,889,204
227 4,889,205
233 4,889,353
248 4,889,206
291 4,889,207

CLASS 181

148 4,889,208
200 4,889,209

CLASS 186

38 4,889,210

CLASS 188

68 4,889,211
112 R 4,889,212

CLASS 192

1.44 4,889,213
17 R 4,889,214
48.1 4,889,215
48.4 4,889,216
48.91 4,889,217
106.2 4,889,218

CLASS 193

25 R 4,889,219

CLASS 194

206 4,889,220
345 4,889,221

CLASS 198

328 4,889,222
364 4,889,223
382 4,889,224
444 4,889,225
450 4,889,226
699.1 4,889,227

CLASS 200

31 R 4,889,964

CLASS 203

2 4,889,600

CLASS 204

37.1 4,889,601
38.1 4,889,602
157.44 4,889,605
157.5 4,889,604
180.1 4,889,603
182.8 4,889,606
192.15 4,889,607
212 4,889,608
298 4,889,609
299 R 4,889,610
411 4,889,611
416 4,889,612
4,889,613

CLASS 206

209 4,889,228
328 4,889,229
362 4,889,230
363 4,889,231
449 4,889,232
455 4,889,233
459 4,889,234
511 4,889,235
531 4,889,236
534 4,889,237
535 4,889,238
611 4,889,239

CLASS 208

48 AA 4,889,614
113 4,889,615
114 4,889,616
121 4,889,617
162 4,889,618

CLASS 209

374 4,889,619
534 4,889,240
552 4,889,241
573 4,889,242
626 4,889,243

CLASS 210

137 4,889,620
168 4,889,621
169 4,889,622
190 4,889,623
232 4,889,624
331 4,889,625
359 4,889,626
360.2 4,889,627
386 4,889,628
401 4,889,629
490 4,889,630
493.1 4,889,631
500.28 4,889,632
639 4,889,633
646 4,889,634
4,889,635
651 4,889,636
701 4,889,637
703 4,889,638
739 4,889,639
751 4,889,640
752 4,889,641
771 4,889,642

CLASS 211

41 4,889,244
49.1 4,889,245
163 4,889,246

CLASS 215

1 C 4,889,247
100 R 4,889,248
228 4,889,250
230 4,889,249
296 4,889,251

CLASS 219

10.55 F 4,889,966
10.55 M 4,889,965
87 4,889,967
121.7 4,889,968
130.51 4,889,969
271 4,889,970
449 4,889,971
472 4,889,972
528 4,889,973
543 4,889,974
548 4,889,975

CLASS 220

3.1 4,889,252
22.1 4,889,253
23.4 4,889,254
83 4,889,255
306 4,889,256
331 4,889,257
429 4,889,258

CLASS 221

75 4,889,259
197 4,889,260

CLASS 222

130 4,889,261
153 4,889,262
185 4,889,263

CLASS 223

37 4,889,264
96 4,889,265
111 4,889,266

CLASS 224

274 4,889,267
277 4,889,268

CLASS 226

97 4,889,269
181 4,889,270
186 4,889,271

CLASS 227

4 4,889,272

CLASS 228

8 4,889,273
179 4,889,274
180.2 4,889,275
4,889,277
265 4,889,276

CLASS 229

92.1 4,889,278

CLASS 232

15 4,889,279

CLASS 235

96 4,889,976
375 4,889,977
379 4,889,978
454 4,889,979
488 4,889,980
490 4,889,981
494 4,889,982

CLASS 236

44 C 4,889,280

CLASS 238

143 4,889,281
347 4,889,282

CLASS 239

11 4,889,283
34 4,889,284
4,889,285
47 4,889,286
498 4,889,287
533.5 4,889,288

CLASS 240

41 4,889,310

CLASS 241

18 4,889,289
36 4,889,290
167 4,889,291

CLASS 242

71.1 4,889,292
75.51 4,889,293
118.3 4,889,294
4,889,295
199 4,889,296

CLASS 244

5 4,889,297

CLASS 248

56 4,889,298
72 4,889,299
97 4,889,300
124 4,889,301
146 4,889,302
160 4,889,303
222.1 4,889,304
265 4,889,305
313 4,889,306
485 4,889,308
524 4,889,309
690 4,889,307

CLASS 249

68 4,889,311
216 4,889,312

CLASS 250

211 J 4,889,983
211 R 4,889,984
214 A 4,889,985
227 4,889,986
282 4,889,987
306 4,889,988
327.2 4,889,989
4,889,990
336.1 4,889,991
343 4,889,992
365 4,889,993
374 4,889,994
441.1 4,889,995
484.1 4,889,996
561 4,889,997
563 4,889,998

CLASS 251

74 4,889,313
129.02 4,889,314
129.03 4,889,315
129.15 4,889,316
212 4,889,317
356 4,889,318
368 4,889,319

CLASS 252

8.514 4,889,645
8.8 4,889,643
8.9 4,889,644
32.7 E 4,889,646
42.7 4,889,647
49.5 4,889,648
73 4,889,649
79 4,889,650
95 4,889,651
99 4,889,652
4,889,653
100 4,889,654
301.22 4,889,655
356 4,889,656
373 4,889,657
4,889,658
500 4,889,659
646 4,889,660

CLASS 254

252 4,889,320
332 4,889,321

CLASS 256

36 4,889,322

CLASS 260

399 B1 4,062,881

CLASS 261

35 4,889,662

CLASS 264

0.5 4,889,663
2.6 4,889,664
10 4,889,665
22 4,889,666
40.1 4,889,667
40.5 4,889,668
45.9 4,889,669
50 4,889,670
53 4,889,671
63 4,889,672
118 4,889,673
130 4,889,674
154 4,889,675
255 4,889,676
297.5 4,889,677
313 4,889,678

CLASS 266

142 4,889,323
157 4,889,324

CLASS 267

140.1 4,889,325
4,889,326
168 4,889,327
293 4,889,328

CLASS 269

2 4,889,329
95 4,889,330

CLASS 271

11 4,889,331
108 4,889,332
272 4,889,333

CLASS 272

73 4,889,335
76 4,889,334
137 4,889,336

CLASS 273

73 D 4,889,337
73 G 4,889,338
143 R 4,889,339
153 S 4,889,340
176 F 4,889,341
176 R 4,889,342
186 A 4,889,343
243 4,889,344
249 4,889,345
406 4,889,346
424 4,889,347

CLASS 277

1 4,889,348
85 4,889,349
88 4,889,350
165 4,889,351

CLASS 280

32.6 4,889,352
236 4,889,354
281.1 4,889,355
416.1 4,889,356
475 4,889,357
628 4,889,358
629 4,889,359
655.1 4,889,360
718 4,889,361
763.1 4,889,362
804 4,889,363
814 4,889,364

CLASS 283

70 4,889,365
86 4,889,366
88 4,889,367

CLASS 285

18 4,889,368
39 4,889,369
342 4,889,370

CLASS 292

201 4,889,371
218 4,889,372
336.3 4,889,373

CLASS 293

132 4,889,374

CLASS 294

10 4,889,375
33 4,889,376

CLASS 296

3 4,889,377
57.1 4,889,378
65.1 4,889,379
97.6 4,889,380
98 4,889,381
180.5 4,889,382

CLASS 297

16 4,889,383
302 4,889,384
4,889,385
359 4,889,386
458 4,889,387
464 4,889,388
468 4,889,389

CLASS 298

5 4,889,390

CLASS 299

9 4,889,391
18 4,889,392
42 4,889,393

CLASS 301

37 PB 4,889,394

CLASS 303

115 4,889,395

CLASS 307

31 4,889,999
36 4,890,000
38 4,890,001
66 4,890,002
4,890,003
4,890,004
87 4,890,005
112 4,890,006
118 4,890,007
149 4,890,008
270 4,890,009
4,890,010
296.2 4,890,011
296.5 4,890,012
355 4,890,013
4,890,014
443 4,890,015
4,890,016
446 4,890,017
4,890,018
475 4,890,019
571 4,890,020
572 4,890,021
602 4,890,022

CLASS 310

12 4,890,023
49 R 4,890,024
68 C 4,890,025
233 4,890,026
261 4,890,028
328 4,890,027

CLASS 312

221 4,899,396
320 4,889,397

CLASS 313

7 4,890,029
25 4,890,030
409 4,890,031
412 4,890,032
487 4,890,033
595 4,890,034
633 4,890,035

CLASS 315

3.5 4,890,036
77 4,890,037
82 4,890,038
119 4,890,039
155 4,890,040
225 4,890,041
248 4,890,042
408 4,890,043
411 4,890,044

CLASS 318

608 4,890,045
630 4,890,046
661 4,890,047
696 4,890,048
771 4,890,049

CLASS 322

34 4,890,050

CLASS 323

313 4,890,051
315 4,890,052

CLASS 324

58.5 A 4,890,053
4,890,054
77 B 4,890,055
83 D 4,890,056
140 D 4,890,057
158 MG 4,890,058
174 4,890,059
239 4,890,060
320 4,890,061
322 4,890,062
4,890,063
329 4,890,064

CLASS 328

155 4,890,065

CLASS 329

369 4,890,066

CLASS 330

4.3 4,890,075
149 4,890,067
253 4,890,068
277 4,890,069
296 4,890,070

CLASS 331

11 4,890,071
4,890,072
55 4,890,073
107 SL 4,890,074

CLASS 332

170 4,890,076

CLASS 333

81 A 4,890,077
134 4,890,078
206 4,890,079

CLASS 335

17 4,890,080
18 4,890,081
301 4,890,082
4,890,083

CLASS 336

30 4,890,084
192 4,890,085
210 4,890,086

CLASS 337

255 Re.33,137

CLASS 338

22 R 4,890,087

CLASS 340

310 A 4,890,089
442 4,890,090
459 4,890,088
467 4,890,091
546 4,890,092
567 4,890,093
571 4,890,094
657 4,890,095
712 4,890,096
719 4,890,097
721 4,890,098
724 4,890,099
799 4,890,100
811 4,890,101
825.17 4,890,102
968 4,890,103
995 4,890,104

CLASS 341

116 4,890,105
144 4,890,106
156 4,890,107
176 4,890,108

CLASS 342

14 4,890,109
35 4,890,110
51 4,890,111
58 4,890,112
163 4,890,113

CLASS 343

702 4,890,114
742 4,890,115
749 4,890,116
773 4,890,117
786 4,890,118

CLASS 346

75 4,890,119
76 PH 4,890,120
4,890,121
140 R 4,890,122
4,890,126
159 4,890,123
160 4,890,124
4,890,125

CLASS 350

3.67 4,889,398
96.12 4,889,401
96.14 4,889,402
96.15 4,889,403
96.16 4,889,404
96.2 4,889,399
96.21 4,889,405
4,889,406
96.29 4,889,407
96.3 4,889,400
96.34 4,889,408
104 4,889,409
317 4,889,410
334 4,889,411
347 E 4,889,412
354 4,889,413
357 4,889,414
358 4,889,415
426 4,889,416
432 4,889,417
486 4,889,418
600 4,889,419

CLASS 351

47 4,889,420
162 4,889,421
210 4,889,422

CLASS 352

46 4,889,423
216 4,889,424

CLASS 354

76 4,890,128
234.1 4,890,129
288 4,890,130
299 4,890,131
400 4,890,132
402 4,890,133
442 4,890,134

CLASS 355

27 4,890,136
57 4,890,137
246 4,890,138
268 4,890,139
290 4,890,140
299 4,890,135

CLASS 356

152 4,889,425
432 4,889,426
445 4,889,427

CLASS 357

23.11 4,890,147
23.3 4,890,141
23.4 4,890,142
4,890,143
4,890,144
23.6 4,890,145
23.8 4,890,146
45 4,890,148
48 4,890,149
52 4,890,150
65 4,890,151
72 4,890,152
74 4,890,153
4,890,154
4,890,155
4,890,156
80 4,890,157

CLASS 358

10 4,890,158
98 4,890,159
105 4,890,160
135 4,890,161
138 4,890,162
181 4,890,163
213.19 4,890,164
213.26 4,890,165
228 4,890,166
335 4,890,168
443 4,890,167

CLASS 360

10.3 4,890,169
65 4,890,170
73.05 4,890,171
77.04 4,890,172
77.15 4,890,173
78.12 4,890,174
97.01 4,890,175
105 4,890,176
107 4,890,177
114 4,890,178
132 4,890,179

CLASS 361

16 4,890,180
18 4,890,181
56 4,890,182
86 4,890,183
87 4,890,184
91 4,890,185
103 4,890,186
111 4,890,187
154 4,890,188
222 4,890,189
235 4,890,190
313 4,890,191
4,890,192
341 4,890,193
386 4,890,194
4,890,195
388 4,890,196
392 4,890,197
399 4,890,198
424 4,890,199

CLASS 362

20 4,890,200
31 4,890,201
61 4,890,202
102 4,890,203
118 4,890,204
154 4,890,205
227 4,890,206
233 4,890,207
294 4,890,208
348 4,890,209

CLASS 363

21 4,890,210
37 4,890,211
49 4,890,212
4,890,213
4,890,214
63 4,890,215
124 4,890,216
143 4,890,217

CLASS 364

200 4,890,218
4,890,219
4,890,220
4,890,221
4,890,222
4,890,223
4,890,224
4,890,225
4,890,226
300 4,890,227
408 4,890,228
410 4,890,229
419 4,890,230
426.04 4,890,231
439 4,890,232
457 4,890,233
468 4,890,235
474.23 4,890,234
485 4,890,236
4,890,237
491 4,890,238
4,890,239
513 4,890,240
4,890,241
518 4,890,242
550 4,890,243
551.01 4,890,244
557 4,890,245
567 4,890,246
571.04 4,890,247
574 4,890,248
578 4,890,249
602 4,890,250
715.08 4,890,251
717 4,890,252
736.5 4,890,253
786 4,890,127
900 4,890,254
4,890,255
4,890,256
4,890,257
4,890,258

CLASS 365

45 4,890,259
49 4,890,260
73 4,890,261
200 4,890,262
218 4,890,263

CLASS 366

1 4,889,428
71 4,889,429
85 4,889,430
99 4,889,431
139 4,889,432
141 4,889,433

CLASS 367

45 4,890,264
94 4,890,265
99 4,890,266
103 4,890,267
138 4,890,268

CLASS 368

15 4,890,269
113 4,890,270

CLASS 369

24 4,890,271
45 4,890,272
4,890,273
4,890,274
59 4,890,275
77.2 4,890,276
219 4,890,277

CLASS 370

17 4,890,278
58.1 4,890,279
60 4,890,280
4,890,281
4,890,282
79 4,890,283
84

CLASS 371

9.1 4,890,284
16.2 4,890,285
37.1 4,890,286
37.2 4,890,287

CLASS 372

31 4,890,288
33 4,890,289
4,890,290
4,890,291
46 4,890,293
57 4,890,294
61 4,890,295
107 4,890,296
415 4,890,292

CLASS 374

25 4,889,434

CLASS 375

1 4,890,297
14 4,890,298
18 4,890,299
60 4,890,300
4,890,301
80 4,890,302
107 4,890,303
114 4,890,304
120 4,890,305

CLASS 376

258 4,889,679
261 4,889,680
272 4,889,681
283 4,889,682
336 4,889,683
444 4,889,684

CLASS 377

15 4,890,306
60 4,890,307
79 4,890,308

CLASS 378

35 4,890,309
82 4,890,310
99 4,890,311
146 4,890,312
189 4,890,313

CLASS 379

53 4,890,314
59 4,890,315
98 4,890,316
132 4,890,317
399 4,890,318

CLASS 380

5 4,890,319
10 4,890,320
20 4,890,321
4,890,322
25 4,890,323
43 4,890,324

CLASS 381

34 4,890,325
35 4,890,326
38 4,890,327
4,890,328
68.7 4,890,329
69.2 4,890,330
120 4,890,331

CLASS 384

276 4,889,435
447 4,889,436

CLASS 400

73 4,889,437
320 4,889,438
706 4,889,439

CLASS 401

1 4,889,440
131 4,889,441
194 4,889,442

CLASS 403

365 4,889,443

CLASS 404

34 4,889,444
64 4,889,445

CLASS 405

19 4,889,446
60 4,889,447
135 4,889,448
154 4,889,449
4,889,450
244 4,889,451

CLASS 406

85 4,889,452

CLASS 408

1 R 4,889,453
124 4,889,454
188 4,889,455
224 4,889,456

CLASS 411

10 4,889,457
383 4,889,458
400 4,889,459
437 4,889,460

CLASS 412

19 4,889,461

CLASS 414

408 4,889,462
416 4,889,463
491 4,889,464
546 4,889,465
694 4,889,466
746.2 4,889,467

CLASS 415

146 4,889,468
191 4,889,469
209.2 4,889,470

CLASS 417

32 4,889,471
46 4,889,472
56 4,889,473
295 4,889,474
350 4,889,475
377 Re.33,135

CLASS 419

9 4,889,685
13 4,889,686

CLASS 420

4,889,687
22 4,889,688

CLASS 422

30 4,889,689
73 4,889,690
102 4,889,691
4,889,692
113 4,889,693
211 4,889,696

CLASS 423

110 4,889,694
132 4,889,695
140 4,889,697
210 4,889,698
4,889,699
220 4,889,700
4,889,701
323 4,889,702
326 4,889,703
387 4,889,704
584 4,889,705
593 4,889,706

CLASS 424

1.1 4,889,707
43 4,889,708
45 4,889,709
47 4,889,711
52 4,889,712
4,889,713
53 4,889,714
80 4,889,715
195.1 4,889,716
408 4,889,719
448 4,889,720
4,889,721
450 4,889,722
4,889,723
649 4,889,724
675 4,889,725

CLASS 425

72.2 4,889,476
133.1 4,889,477
149 4,889,478
185 4,889,479
577 4,889,480

CLASS 426

3 4,889,726
4,889,727
5 4,889,728
94 4,889,729
102 4,889,730
106 4,889,731
319 4,889,732
438 4,889,733
444 4,889,734
495 4,889,743
536 4,889,735
4,889,736
550 4,889,737
572 4,889,738
599 4,889,739
606 4,889,740
614 4,889,741
643 4,889,742

CLASS 427

2 4,889,744
12 4,889,745
162 4,889,746
221 4,889,747
356 4,889,073

CLASS 428

11 4,889,748
13 4,889,749
34.2 4,889,750
34.8 4,889,751
36.92 4,889,752
40 4,889,753
41 4,889,754
42 4,889,755
62 B 4,889,775
64 4,889,756
4,889,757
178 4,889,758
181 4,889,759
192 4,889,760
195 4,889,761
4,889,762
246 4,889,763
283 4,889,764
290 4,889,765
304.4 4,889,717
324 4,889,766
336 4,889,767
343 4,889,718
429 4,889,768
432 4,889,769
447 4,889,770
541 4,889,771
547 4,889,772
552 4,889,773
614 4,889,774
629 4,889,776

CLASS 429

162 4,889,777
190 4,889,778
196 4,889,779

CLASS 430

1 4,889,780
25 4,889,781
57 4,889,782
4,889,783
58 4,889,784
59 4,889,785
138 4,889,786
166 4,889,787
191 4,889,788
4,889,789
270 4,889,791
281 4,889,792
284 4,889,793
293 4,889,794
326 4,889,795
549 4,889,796

CLASS 431

328 4,889,481
329 Re.33,136
344 4,889,482

CLASS 432

49 4,889,483
103 4,889,484

CLASS 433

9 4,889,485
60 4,889,486
102 4,889,487
110 4,889,488
134 4,889,489
136 4,889,490
4,889,491

CLASS 435

4 4,889,797
6 4,889,798
4,889,799
7 4,889,800
25 4,889,801
69.1 4,889,802
69.51 4,889,803
155 4,889,804
161 4,889,805
172.3 4,889,806
192 4,889,807
194 4,889,818
240.1 4,889,808
252.3 4,889,809
252.9 4,889,810
265 4,889,811
289 4,889,812

CLASS 436

60 4,889,813
133 4,889,814
517 4,889,815
518 4,889,816

CLASS 437

15 4,889,492
22 4,889,817
27 4,889,819
29 4,889,820
31 4,889,821
4,889,822
4,889,823
4,889,824
34 4,889,825
4,889,828
40 4,889,826
41 4,889,827
69 4,889,829
167 4,889,830
184 4,889,831
203 4,889,832
265 4,889,493

CLASS 439

13 4,889,494
60 4,889,495
75 4,889,496
76 4,889,497
86 4,889,498
258 4,889,790
268 4,889,499
579 4,889,500
595 4,889,501
607 4,889,502
610 4,889,503
712 4,889,504
733 4,889,505
874 4,889,506

CLASS 440

61 4,889,507
103 4,889,508
105 4,889,509

CLASS 441

63 4,889,510
88 4,889,511

CLASS 446

72 4,889,512
197 4,889,513
230 4,889,514
428 4,889,515
462 4,889,516

CLASS 455

67 4,890,332
4,890,333
89 4,890,334

CLASS 460

66 4,889,517

CLASS 464

102 4,889,518

CLASS 474

101 4,889,519
135 4,889,520
164 4,889,521

CLASSIFICATION OF PATENTS

CLASS 493

193 4,889,522
195 4,889,523

CLASS 494

12 4,889,524

CLASS 501

1 4,889,833
89 4,889,834
4,889,835
97 4,889,836
139 4,889,837

CLASS 502

27 4,889,838
242 4,889,839
255 4,889,840

CLASS 503

209 4,889,841

CLASS 514

8 4,889,842
54 4,889,843
60 4,889,844
63 4,889,845
150 4,889,846
171 4,889,847
212 4,889,848
218 4,889,849
221 4,889,850
223.2 4,889,851
227.5 4,889,853
228.2 4,889,854
230.5 4,889,852
235.2 4,889,857
250 4,889,855
254 4,889,856
4,889,858
258 4,889,859
282 4,889,860
300 4,889,861
311 4,889,862
312 4,889,863
326 4,889,864
332 4,889,865
347 4,889,866
365 4,889,867
392 4,889,868
400 4,889,869
429 4,889,870
456 4,889,871
531 4,889,872
560 4,889,873
575 4,889,874

CLASS 521

115 4,889,908
123 4,889,875

CLASS 522

135 4,889,876

CLASS 523

161 4,889,877
200 4,889,878

CLASS 524

13 4,889,879
71 4,889,880
91 4,889,881
100 4,889,882
289 4,889,883
314 4,889,884
445 4,889,885
449 4,889,886
510 4,889,887

CLASS 525

54.1 4,889,916
67 4,889,898
75 4,889,888
92 4,889,889
113 4,889,890
139 4,889,891
186 4,889,892
189 4,889,893
227 4,889,894
278 4,889,895
375 4,889,896
388 4,889,897
458 4,889,915
479 4,889,899

CLASS 526

77 4,889,900
279 4,889,901

CLASS 527

400 4,889,902

CLASS 528

17 4,889,903
25 4,889,904
30 4,889,905
96 4,889,907
125 4,889,909
4,889,912
168 4,889,910
182 4,889,911
392 4,889,913
4,889,914

CLASS 530

324 4,889,917
350 4,889,918
351 4,889,919
355 4,889,920
377 4,889,921
413 4,889,922

CLASS 534

597 4,889,923
658 4,889,924

CLASS 536

6.4 4,889,926
18.6 4,889,925
4,889,927
122 4,889,928

CLASS 540

318 4,889,929
363 4,889,930
465 4,889,931

CLASS 544

348 4,889,932

CLASS 546

114 4,889,933
151 4,889,934
176 4,889,935

CLASS 548

149 4,889,936
420 4,889,937

CLASS 549

10 4,889,938
13 4,889,939
81 4,889,940
403 4,889,941

CLASS 556

419 4,889,942

CLASS 558

71 4,889,943
81 4,889,906
171 4,889,944
186 4,889,945

CLASS 560

21 4,889,946
119 4,889,947
181 4,889,948
202 4,889,949
205 4,889,950

CLASS 562

427 4,889,951
460 4,889,952
815 4,889,661

CLASS 564

293 4,889,953
298 4,889,954
440 4,889,955

CLASS 568

13 4,889,956
454 4,889,957

CLASS 600

1 4,889,525
14 4,889,526

CLASS 604

29 4,889,527
65 4,889,528
274 4,889,529
304 4,889,530
319 4,889,531
330 4,889,532
4,889,533
339 4,889,534

CLASS 606

69 4,889,110
108 4,889,118
181 4,889,117
216 4,889,120
220 4,889,119

CLASSIFICATION OF DESIGNS

D2— 25 305,175
270 305,176
314 305,177
315 305,178
D3— 30.1 305,179
62 305,180
305,210
D5— 53 305,181
305,182
D6— 366 305,183
381 305,184
426 305,185
436 305,186
465 305,187
487 305,188
510 305,189
567 305,190
D7— 1 305,191
305,192
6 305,193
9 305,194
45 305,195
57 305,196
354 305,197
D8— 8 305,198
14 305,199
50 305,200
57 305,201
70 305,202
98 305,203
D9— 418 305,204
305,205
449 305,206
D10— 15 305,207
46 305,208
96 305,209
106 305,211
109 305,212
305,213
D11— 26 305,214
99 305,215
105 305,216
D12— 128 305,217
129 305,218
133 305,219
142 305,220
147 305,221
153 305,222
176 305,223
D13— 24 305,224
305,225
28 305,226
D14— 100 305,227
107 305,228
114 305,229
124 305,230
138 305,231
305,232
191 305,233
194 305,234
249 305,235
D15— 23 305,236
69 305,237
139 305,238
305,239
D16— 202 305,240
223 305,241
D18— 12 305,242
305,243
18 305,244
D19— 57 305,245
75 305,246
D21— 59 305,247
305,248
305,249
136 305,250
147 305,252
148 305,251
161 305,253
162 305,254
163 305,255
198 305,256
D22— 118 305,257
132 305,258
D23— 205 305,259
337 305,260
D24— 9 305,261
60 305,262
D25— 10 305,263
D26— 23 305,264
D28— 48 305,265
59 305,266
60 305,267
88 305,268
D32— 22 305,269
47 305,270
D34— 40 305,271
305,274
42 305,272
305,273

CLASSIFICATION OF PLANTS

P.— 38 7,082
68 7,083
7,084
7,085
7,086
7,087
69 7,088

GEOGRAPHICAL INDEX

OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01 :	4,888,881		4,889,246		4,890,013		4,890,184		4,889,055	19 :	4,888,937
	4,889,019		4,889,268		4,890,023		4,890,208		4,889,120		4,888,940
	4,889,295		4,889,276		4,890,027		4,890,284		4,889,151		4,889,047
	4,889,400		4,889,283		4,890,040	10 :	4,889,372		4,889,203		4,889,075
	4,889,436		4,889,300		4,890,077		4,889,491		4,889,231		4,889,310
	4,889,543		4,889,302		4,890,093		4,889,550		4,889,256		4,889,420
04 :	4,888,836		4,889,313		4,890,094		4,889,705		4,889,263		4,890,217
	4,889,322		4,889,341		4,890,108		4,889,862		4,889,278	20 :	4,889,257
	4,889,440		4,889,347		4,890,109		4,889,882		4,889,327		4,890,320
	4,889,590		4,889,352		4,890,118		4,889,947		4,889,346	21 :	4,888,831
	4,889,714		4,889,357		4,890,135	12 :	4,888,897		4,889,348		4,888,903
	4,890,069		4,889,360		4,890,146		4,888,921		4,889,365		4,889,018
	4,890,072		4,889,361		4,890,153		4,888,925		4,889,375		4,889,309
	4,890,091		4,889,370		4,890,154		4,888,941		4,889,418		4,889,439
	4,890,156		4,889,385		4,890,163		4,888,954		4,889,472		4,889,443
	4,890,222		4,889,397		4,890,176		4,889,064		4,889,532		4,889,559
05 :	4,888,957		4,889,403		4,890,188		4,889,117		4,889,533	22 :	4,889,049
	4,889,025		4,889,419		4,890,211		4,889,185		4,889,534		4,889,198
	4,889,355		4,889,423		4,890,224		4,889,214		4,889,581		4,889,249
	4,889,464		4,889,424		4,890,229		4,889,248		4,889,612		4,889,951
	4,889,977		4,889,441		4,890,236		4,889,275		4,889,634		4,889,954
06 :	4,888,861		4,889,487		4,890,240		4,889,377		4,889,646		4,889,955
	4,888,868		4,889,499		4,890,248		4,889,428		4,889,726	23 :	4,888,901
	4,888,872		4,889,506		4,890,252		4,889,454		4,889,727		4,888,986
	4,888,887		4,889,510		4,890,259		4,889,470		4,889,751		4,890,318
	4,888,896		4,889,526		4,890,260		4,889,546		4,889,779	24 :	4,888,888
	4,888,898		4,889,575		4,890,265		4,889,572		4,889,844		4,889,134
	4,888,907		4,889,585		4,890,269		4,889,582		4,889,871		4,889,137
	4,888,912		4,889,588		4,890,279		4,889,589		4,889,901		4,889,239
	4,888,968		4,889,605		4,890,282		4,889,747		4,889,960		4,889,331
	4,888,973		4,889,611		4,890,289		4,890,047		4,889,970		4,889,610
	4,888,998		4,889,613		4,890,304		4,890,195		4,889,987		4,889,725
	4,889,010		4,889,617	08 :	4,888,880		4,890,219		4,890,002		4,889,860
	4,889,022		4,889,618		4,888,899	13 :	4,888,893		4,890,005		4,889,916
	4,889,028		4,889,654		4,888,958		4,888,894		4,890,039		4,890,113
	4,869,031		4,889,675		4,888,991		4,888,920		4,890,050		4,890,136
	4,889,032		4,889,676		4,888,992		4,888,996		4,890,119		4,890,232
	4,889,043		4,889,682		4,889,141		4,889,061		4,890,199		4,890,313
	4,889,044		4,889,684		4,889,243		4,889,148		4,890,205	25 :	4,888,838
	4,889,067		4,889,740		4,889,388		4,889,261		4,890,271		4,889,035
	4,889,108		4,889,744		4,889,409		4,889,285		4,890,296		4,889,092
	4,889,109		4,889,780		4,889,784		4,889,662		4,890,316		4,889,307
	4,889,123		4,889,790		4,889,992		4,889,689		4,890,328		4,889,362
	4,889,130		4,889,800		4,890,065		4,889,693	18 :	4,888,876		4,889,414
	4,889,150		4,889,802	09 :	4,888,930	16 :	4,889,191		4,888,947		4,889,508
	4,889,167		4,889,818		4,888,938		4,889,733		4,889,078		4,889,565
	4,889,171		4,889,842		4,888,974		4,889,734		4,889,175		4,889,583
	4,889,186		4,889,866		4,889,131		4,889,737		4,889,316		4,889,692
	4,889,188		4,889,931		4,889,306		4,890,088		4,889,696		4,889,836
	4,889,202		4,889,976		4,889,484	17 :	4,888,826		4,889,809		4,890,019
	4,889,210		4,889,979		4,889,541		4,888,834		4,890,010		4,890,030
	4,889,232		4,889,981		4,889,549		4,888,843		4,890,044		4,890,055
	4,889,234		4,889,988		4,889,647		4,889,034		4,890,162		4,890,172

4,890,218
4,890,221
4,890,239
4,890,270
4,890,285
30 : 4,890,128
4,890,309
32 : 4,888,830
26 : 4,888,832
33 : 4,888,885
4,888,841
4,888,854
4,888,910
4,888,919
4,888,926
4,888,929
4,888,949
4,888,962
4,888,965
34 : 4,888,846
4,889,003
4,889,168
4,889,189
4,889,245
4,889,265
4,889,334
4,889,368
4,889,380
4,889,389
4,889,396
4,889,446
4,889,460
4,889,465
4,889,475
4,889,483
4,889,574
4,889,609
4,889,668
4,889,750
4,889,753
4,889,764
4,889,878
4,889,899
4,889,902
4,889,903
4,889,904
4,889,942
4,890,092
4,890,200
4,890,231
4,890,305
27 : Re.33,135
4,888,827
4,888,959
4,888,985
4,889,070
4,889,077
4,889,280
4,889,344
4,889,656
4,889,787
4,889,792
4,889,895
4,889,932
4,889,961
4,890,190
4,890,287
28 : 4,888,902
4,889,948
4,890,331
29 : Re.33,137
4,888,849
4,888,879
4,888,908
35 : 4,889,343
4,889,159
4,889,305
4,889,318
4,889,619
36 : 4,888,844
4,889,707

4,889,806
4,889,906
4,889,922
4,890,086
4,890,107
4,888,830
4,888,885
4,888,923
4,889,247
4,889,438
4,889,626
4,889,752
4,890,102
4,890,112
4,890,225
4,888,846
4,888,882
4,888,886
4,888,935
4,888,964
4,888,969
4,888,999
4,889,021
4,889,050
4,889,072
4,889,091
4,889,119
4,889,236
4,889,262
4,889,284
4,889,286
4,889,290
4,889,402
4,889,422
4,889,448
4,889,459
4,889,476
4,889,542
4,889,568
4,889,615
4,889,624
4,889,645
4,889,652
4,889,653
4,889,712
4,889,713
4,889,722
4,889,758
4,889,771
4,889,839
4,889,856
4,889,859
4,889,861
4,889,867
4,889,868
4,889,873
4,889,874
4,889,887
4,889,915
4,889,930
4,889,993
4,890,004
4,890,068
4,890,131
4,890,228
4,890,241
4,890,250
4,890,314
4,890,322
4,889,343
4,889,492
4,890,203
4,890,278
4,888,844
4,888,904

4,888,905
4,889,002
4,889,039
4,889,103
4,889,107
4,889,111
4,889,118
4,889,129
4,889,142
4,889,147
4,889,156
4,889,179
4,889,238
4,889,260
4,889,269
4,889,272
4,889,277
4,889,342
4,889,398
4,889,404
4,889,410
4,889,411
4,889,481
4,889,500
4,889,503
4,889,513
4,889,531
4,889,599
4,889,603
4,889,616
4,889,657
4,889,658
4,889,686
4,889,699
4,889,709
4,889,718
4,889,741
4,889,776
4,889,798
4,889,819
4,889,838
4,889,845
4,889,889
4,889,941
4,890,007
4,890,042
4,890,101
4,890,129
4,890,143
4,890,150
4,890,242
4,890,253
4,890,268
4,890,283
4,890,327
37 : 4,888,863
4,888,883
4,888,900
4,889,056
4,889,132
4,889,143
4,889,160
4,889,209
4,889,311
4,889,329
4,889,717
4,889,962
4,890,089
4,890,210
38 : 4,888,847
39 : 4,888,851
4,888,875
4,888,890
4,888,909
4,888,918

4,888,942
4,888,950
4,888,951
4,888,989
4,889,012
4,889,146
4,889,149
4,889,153
4,889,212
4,889,244
4,889,293
4,889,324
4,889,330
4,889,457
4,889,511
4,889,530
4,889,623
4,889,637
4,889,643
4,889,730
4,889,739
4,889,877
4,889,880
4,889,973
4,889,975
4,889,991
4,890,036
4,890,115
4,890,198
4,890,235
4,062,881
40 : 4,888,914
4,889,600
4,889,639
4,889,754
4,889,840
4,890,098
4,890,741
41 : 4,888,869
4,888,895
4,889,011
4,889,133
4,889,152
4,889,169
4,889,301
4,889,351
4,889,560
4,889,573
4,889,761
4,889,812
4,889,850
4,890,048
4,890,067
4,890,158
4,890,237
4,890,290
42 : 4,888,845
4,888,939
4,888,995
4,889,000
4,889,054
4,889,058
4,889,059
4,889,060
4,889,116
4,889,196
4,889,304
4,889,325
4,889,369
4,889,407
4,889,452
4,889,453
4,889,496
4,889,502
4,889,514
4,889,515

4,889,516
4,889,525
4,889,556
4,889,558
4,889,571
4,889,579
4,889,608
4,889,679
4,889,680
4,889,681
4,889,691
4,889,695
4,889,703
4,889,765
4,889,778
4,889,808
4,889,847
4,889,890
4,889,891
4,889,935
4,889,999
4,890,081
44 : 4,889,013
4,890,083
45 : 4,888,979
4,889,155
4,889,193
4,889,294
4,889,340
4,889,383
4,889,490
4,889,731
4,889,732
4,890,116
47 : 4,888,842
4,888,924
4,889,105
4,889,230
4,889,267
4,889,432
4,889,445
4,889,595
4,889,596
4,889,597
4,890,326
48 : Re.33,134
4,888,833
4,888,922
4,888,961
4,888,975
4,889,020
4,889,097
4,889,128
4,889,135
4,889,158
4,889,180
4,889,183
4,889,187
4,889,211
4,889,219
4,889,241
4,889,250
4,889,259
4,889,274
4,889,321
4,889,367
4,889,378
4,889,391
4,889,433
4,889,444
4,889,447
4,889,449
4,889,473
4,889,540
4,889,545

4,889,577
4,889,614
4,889,701
4,889,825
4,889,832
4,889,900
4,889,907
4,890,015
4,890,052
4,890,127
4,890,141
4,890,144
4,890,145
4,890,147
4,890,157
4,890,192
4,890,194
4,890,196
4,890,207
4,890,223
4,890,247
4,890,254
4,890,263
4,890,264
4,890,317
49 : 4,889,040
4,889,266
4,889,303
4,890,297
51 : 4,888,955
4,888,988
4,888,990
4,889,421
4,889,512
4,889,748
4,889,912
4,889,986
4,890,041
4,890,053
4,890,075
4,890,105
4,890,249
4,890,315
53 : 4,889,048
4,889,102
4,889,237
4,889,252
4,889,381
4,889,425
4,889,463
4,889,539
4,889,569
4,889,660
4,889,799
4,889,919
4,889,959
4,890,021
4,890,071
4,890,179
54 : 4,889,392
55 : 4,888,980
4,889,006
4,889,161
4,889,213
4,889,224
4,889,356
4,889,384
4,889,505
4,889,522
4,889,620
4,889,640
4,889,710
4,889,755
4,889,898
4,889,964

DESIGN PATENTS

04 : 305,219
05 : 305,256
06 : 305,177
305,183
305,193
305,197
305,208
305,212
305,214
305,227

09 : 305,265
12 : 305,192
305,272
17 : 305,209
305,229
305,235
18 : 305,179
19 : 305,266
21 : 305,187
22 : 305,216

24 : 305,190
305,191
25 : 305,176
27 : 305,198
305,215
305,246
305,270
29 : 305,178
305,258
34 : 305,250

36 : 305,186
305,196
305,211
305,222
305,230
305,184
305,217
305,239
305,244
39 : 305,202

305,206
305,223
305,228
40 : 305,199
43 : 305,185
44 : 305,251
305,254
305,262
48 : 305,213
305,259

305,263
49 : 305,252
53 : 305,203
55 : 305,181
305,182
305,195
305,204
305,205
305,257

PLANT PATENTS

06 : 7,082

U.S. GOVERNMENT PRINTING OFFICE : O—1989

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

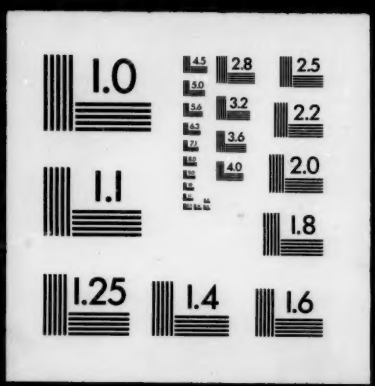
(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

U.S. DEPARTMENT OF COMMERCE
Robert A. Mosbacher, *Secretary*
PATENT AND TRADEMARK OFFICE
Jeffrey M. Samuels, *Acting Commissioner*


1.0
1.1
1.25
1.4
1.6
2.8
2.5
3.2
2.2
3.6
2.0
4.0
1.8